

180. *FRANCOLINUS CASTANEICOLLIS*.

*Francolinus castaneicollis*, Salvad. Ann. Mus. Genov. xxvi. p. 542 (1888); Grant, Cat. B. Brit. Mus. xxii. p. 153 (1893).

a. ♂ ad. Sheik Mahomed, Nov. 2, 1894. Iris dark brown; feet brownish orange; bill vermilion.

b. ♀ ad. Sheik Mahomed, Nov. 8, 1894. Iris brown; feet salmon-colour; bill brown, lower mandible reddish.

Discovered in Shoa at Lake Ciar-Ciar.

181. *FRANCOLINUS GRANTI*.

*Francolinus granti*, Hartl.; Heugl. Orn. N.O.-Afr. ii. p. 891 (1873); Sharpe, Ibis, 1892, p. 551; Ogilvie-Grant, Cat. B. Brit. Mus. xxii. p. 148 (1893); Salvad. Mem. R. Accad. Torino, (2) xlv. p. 562 (1894: Odeuin Plains); Reichen. Vög. Deutsch-Ost-Afr. p. 78 (1894).

a. ♀ ad. Sassabane, July 31, 1894. Iris brown; feet light red.

Mr. Jackson procured examples of this species at Machako's and again on the Victoria Nyanza. Between the lake and the coast Dr. Reichenow gives many localities where it has occurred.

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June 18, 1895.

Sir W. H. FLOWER, K.C.B., LL.D., F.R.S., President,  
in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of May:—

The registered additions to the Society's Menagerie during the month of May were 130 in number. Of these 67 were acquired by presentation, 24 by purchase, 3 by exchange, 15 were born in the Gardens, and 21 were received on deposit. The total number of departures during the same period, by death and removals, was 90.

Among these, special attention may be called to the following:—

1. A Black-billed Sheathbill (*Chionis minor*), captured at sea, in about 52° S., 55° W., and presented by Mr. John Gunn, of the German Barque 'Prof. Koch,' May 1st.

We have now specimens of both species of the Sheathbills (*Chionis alba* and *C. minor*) living in the Society's Gardens.

2. A female Grysbok (*Neotragus melanotis*), presented by J. E. Matcham, Esq., of Port Elizabeth, South Africa, and received May 26.

This is one of the smaller Cape Antelopes rarely seen in captivity; we have received no specimen of it for the last twenty years.

3. A young male Panolia Deer (*Cervus eldi*) from Southern China, presented by Julius Neumann, Esq., C.M.Z.S., and received May 29, 1895.

So far as I know, the only specimen of this beautiful Deer

previously received by the Society was the female presented by Mr. A. Grote in 1867, which was figured in the Society's Transactions (vol. vii. pls. xxxvii.-xxxviii.); see also P. Z. S. 1867, p. 821.

I also take this opportunity of mentioning that the animal presented to the Society on the 28th March, 1894, by Mr. A. Murray, and entered as a Kinkajou (as it was called by the donor), appears to be a specimen of the rare American Carnivore *Bassaricyon alleni*, Thomas, P. Z. S. 1880, p. 397, pl. xxxviii., with the apical portion of the tail removed. Mr. Murray informs us that this specimen was captured in the woods at Bastrica on the Essequibo River, British Guiana.

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Referring to his note on the occurrence of the Barbary Sheep (*Ovis tragelaphus*) in Egypt, read on January 15th last (see P. Z. S. 1895, p. 85), Mr. Selater exhibited the head of this sheep, obtained by Captain J. G. Dunning near Wady Halfa, which, at the time of reading his note, Mr. Selater had spoken of as "not having been received," but which had arrived since.

Mr. Selater said there could be no doubt as to the specimen in question belonging to the Barbary Sheep, *Ovis tragelaphus*. Captain Dunning, having unfortunately lost his life in Uganda, Mr. Selater stated that he proposed to deposit the present specimen in the British Museum.

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Mr. Selater exhibited the skin of a Humming-bird (*Anthocephala berlepschi*, Salvin, Ibis, 1894, p. 120), which he had received in a letter addressed to him by Mr. Robert B. White, C.M.Z.S., from Palencia, a department of Cauca, Republic of Colombia, April 15th, 1895. Mr. White observed that this species until recently was supposed to be unknown in Colombia; he had lately found it, but only in one locality, in the extreme south of the Magdalena Valley, where it was by no means easy to obtain it.

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Prof. G. B. Howes exhibited the skull of a Rabbit destitute of the second pair of upper incisors, which he owed to the acumen of his Laboratory Attendant, J. E. Redsull.

The animal from which this specimen had been obtained was an old "Hare-coloured" or "Belgian" Rabbit, purchased in the market, and was in no other respect observed to be abnormal. Prof. Howes had met with specimens showing the absence of one of the smaller incisors on the right and on the left side, and one in which the left tooth was wanting, that of the right being greatly hypertrophied, its alveolus being almost as large in area as that of the first incisor<sup>1</sup>. As the skull exhibited was the first, among some thousands which had passed through his hands, in

<sup>1</sup> Specimens of these were exhibited.

which both the second incisors were wanting, and as von Nathusius, in his lengthy experience of the Leporines, had recorded<sup>1</sup> but two similar cases, the variation would appear to be very exceptional. In the specimen exhibited the single pair of incisors in both upper and lower jaw were longer and more curved than is usual where the smaller upper incisors are present. This was most marked in the lower jaw, the cutting-edges of the incisors, instead of terminating posteriorly on a level with the upper surface of the symphyseal end of the mandible, standing 3 millim. above it. In this greater elongation of the incisors the specimen approximated the more closely towards the simplicidentate type.

Nathusius had remarked of one of the two examples which fell into his hands that not only were there no traces of the teeth in question, but that there were no indications of their having been developed and subsequently lost. In the specimen which Prof. Howes exhibited the premaxillæ bore a couple of excessively minute perforations, which might possibly be the reduced vestiges of the alveoli of the missing teeth. That of the left side, however, led off into an outwardly directed groove, and from the characters of these passages, in consideration of the recent careful investigation of Aschenbrandt<sup>2</sup>, he was disposed to regard them as those of transit of palatal branches of the naso-palatine nerve.

The cheek-teeth of the specimen showed no features that were exceptional.

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A letter was read, addressed to the Secretary by Dr. A. A. W. Hubrecht, F.M.Z.S., calling attention to the account of a supposed new Mammal from Sumatra by him, published in the 'Notes from the Leyden Museum' (vol. xiii. p. 241), under the belief that it would turn out to be an unknown species of Edentate, and which he had proposed to call *Trichomanis hoevenii*. Further inquiries and information received from Mr. Pruyss Van der Hoeven (after whom the supposed new animal had been named) had convinced Dr. Hubrecht that it was an *Arctonyx* (*A. collaris*), and that no further hopes could be entertained of the existence of an unknown Edentate in the forests of Sumatra.

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In reference to his remarks made at the last meeting (see above, p. 400) on the existence of a second Gazelle in Egypt, besides *Gazella dorcas*, Mr. Sclater exhibited the skin and skull of the male Gazelle of this second species which he had seen alive at Cairo. These had been kindly sent to him by Mr. Jennings Bramley. Mr. Sclater had ascertained, by comparison with one of the typical specimens in the British Museum, that they were referable to Mr. Thomas's lately described species *Gazella loderi* (P. Z. S. 1894, p. 470, pl. xxxii.), the extension of which into Egypt was a novel fact of great interest.

<sup>1</sup> Der zoolog. Garten, Jhg. xx. p. 134.

<sup>2</sup> Verhandl. d. phys.-med. Gesellsch. Würzburg, n.F. Bd. xx. No. 2 (p. 11),

This Gazelle was said to be known to the Arabs of the Libyan or Western Desert of Egypt as the "Ghazal abiad," or White Gazelle; but was certainly not nearly so common as *Gazella dorcas*, which occurred in both the Eastern and Western Deserts.

Mr. W. Saville Kent, F.Z.S., exhibited a coloured sketch of a species of Nudibranchiate Mollusk, which he had met with in Western Australia, remarkable for its large size and colouring, and probably referable to *Doris* or an allied genus.

A communication was read from Messrs. F. E. Beddard, M.A., F.R.S., and A. C. Haddon, M.A., M.R.I.A., containing descriptions of a number of new species of Nudibranchiate Mollusks, examples of which had been collected by the latter author during his recent stay in the neighbourhood of Torres Straits.

This paper will be published entire in the Society's 'Transactions.'

Mr. G. A. Boulenger, F.R.S., gave an account of a large collection of Fishes formed by Dr. C. Ternetz at various localities in Matto Grosso and Paraguay. So few Fishes had been collected in the Paraguay system since the time of Natterer, that it seemed desirable that a full list of all the species represented in the present collection should be given. This was accordingly done, the specimens being referred to 97 species, of which the following were described as new:—

1. *PLAGIOSCION TERNETZI*, sp. n.

Outer, upper, and inner lower teeth considerably enlarged. Depth of body 3 times in total length, length of head 3 to  $3\frac{1}{4}$  times; snout a little longer than diameter of eye, which is 5 to  $5\frac{1}{2}$  times in length of head; interorbital width equal to length of snout, 4 times in length of head; maxillary extending to below posterior border of eye; præopercular border rounded, finely denticulated behind, with wide-apart small serræ at the angle and below. 15 gill-rakers on lower part of anterior arch, the longest as long as or a little shorter than longest gill-filaments. Lower pharyngeal teeth villiform. Dorsal X, I 33-35: third and fourth or fourth and fifth spines longest,  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Pectoral nearly  $\frac{3}{4}$  length of head. Anal II 6; second spine very strong,  $\frac{1}{3}$  length of head. Caudal pointed, densely scaled. The distance between base of anal and base of caudal  $2\frac{1}{3}$  depth of caudal peduncle. Scales nearly all ctenoid, 95-100  $\frac{13-14}{23-24}$ ; lat. l. 48-50. Uniform silvery.

Total length 450 millim.

Two specimens, from Remanso, Rio Grande, Paraguay.

This species is allied to *Sciæna surinamensis*, Blkr.

2. *GEOPHAGUS DUODECIMSPINOSUS*, sp. n.

Depth of body  $1\frac{4}{5}$  in total length, length of head 3 times. Eye nearer gill-opening than end of snout, its diameter  $3\frac{1}{2}$  times in length of head and a little less than interorbital width; præ-orbital  $1\frac{1}{3}$  diameter of eye; scales on cheek small, in 7 series. Dorsal XII 14; spines increasing in length to the fourth, which is  $\frac{2}{3}$  length of head; soft portion scaly at the base, longest rays nearly as long as head. Pectoral a little longer than head. Ventral shorter, reaching anal. Anal III 9; third spine longest, as long as third dorsal. Caudal truncate. Scales  $30\frac{4}{10}$ ; lat. l.  $\frac{18}{9}$ . Yellowish, with a dark vertical streak below the eye, and a dark round spot on the side below the lateral line; vertical fins brownish, with some small, round, white spots on the soft dorsal and anal; pectorals white, ventrals blackish.

Total length 90 millim.

A single specimen from Paraguay.

3. *EUANEMUS NIGRIPINNIS*, sp. n.

Depth of body equal to length of head,  $4\frac{1}{2}$  to 5 times in total length; width of head equal to length without snout; groove extending from end of snout to occipital bone; eye as long as snout,  $3\frac{2}{3}$  times in length of head, half interorbital width; maxillary barbels extending nearly to end of pectoral spine, mandibular barbels to a little beyond base of pectoral spine. Humeral process covered with skin,  $\frac{1}{4}$  length of pectoral spine. Dorsal I 6; spine serrated behind, as long as head. Pectoral spine a little shorter than head. Ventral as long as pectoral, reaching a little beyond origin of anal. Anal 36-37. Caudal deeply notched. Upper surface of head, back, and a lateral stripe dark grey, rest white; pectorals and ventrals deep black, white at the base; caudal black at the base.

Total length 190 millim.

Four specimens from Paraguay.

4. *OXYDORAS EIGENMANNI*, sp. n.

Both jaws with small teeth. Depth of body equal to length of head, 4 times in total length. Posterior nostril nearer the eye than to the anterior nostril; diameter of eye 4 times in length of head,  $1\frac{1}{4}$  in interorbital width,  $1\frac{3}{4}$  in length of snout; bases of the six barbels united by the fold of the lower jaw; maxillary barbels with smaller tentacles at the base, extending a little beyond base of pectoral spine, twice as long as mandibulars. Gill-cleft extending to below posterior border of eye. Humeral process striated, half as long as pectoral spine. Pectoral spine a little longer than the head. Dorsal I 6; spine a little shorter than the head, very strongly serrated in front, very feebly behind. Adipose fin a little shorter than base of anal. No shields between the dorsal fins. Lateral shields moderate, third vertical diameter equal to the eye, serrated behind, 26 or 27. Caudal bifurcate,

Brown above, whitish beneath; fins uniform or with small blackish spots.

Total length 80 millim.

Several specimens from Descalvados, Matto Grosso.

This species is named after Prof. C. Eigenmann, the author of the excellent Synopsis of South American Siluroid Fishes. It connects the sections *Oxydoras* and *Rhinodoras* as defined by that author, agreeing with the former in the serrature of the dorsal spine, with the latter in all other respects.

##### 5. *CALLICHTHYS PECTORALIS*, sp. n.

Depth of body  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times in total length. Head depressed, broader than deep,  $3\frac{1}{2}$  times in total length, without bristles on the sides; diameter of eye 6 times in length of head, 4 times in interorbital width; suborbital bone narrow; occipital bone pointed in front, not reaching frontal fontanelle; inner barbels half total length. Pectoral spine  $\frac{2}{3}$  length of head, covered with fine bristles, serrated on the inner side. Dorsal I 7; spine nearly  $\frac{1}{2}$  length of head. Anal I 5. A pair of large pectoral plates, in contact anteriorly, or narrowly separated, their inner borders diverging behind. Shields on body reaching to base of dorsal fins, 23 above and 22 below lateral line; 3 or 4 pairs and 5 to 7 azygos shields between the two dorsal fins. Caudal rounded. Dark brown, with small blackish spots.

Total length 85 millim.

Several specimens from Monte Sociedad, Paraguayan Chaco.

This species is nearest allied to *C. thoracatus*, C. & V., and *C. longifilis*, C. & V., but differs in the larger pectoral plates, the wide separation between the frontal fontanelle and the occipital bone, and in the smaller number of anal rays.

##### 6. *PLECOSTOMUS TERNETZI*, sp. n.

Head as long as broad, 3 times in total length; three very obtuse keels; snout rounded, entirely granulated; diameter of eye 7 times in length of head, 4 times in length of snout,  $2\frac{1}{2}$  times in interorbital width; barbel as long as diameter of eye; 44 teeth on each side in the upper jaw, and about as many in the lower jaw; interopercle with very small spines. Sides of throat, thorax, and middle of belly covered with small shields. Dorsal I 7; first ray as long as head, reaching adipose fin. Pectoral spine as long as head, strong, with small curved spines. Ventrals I 5, first ray a little shorter than head. Anal I 4. Lower caudal rays very long, as long as head, twice as long as upper. Depth of caudal peduncle  $2\frac{1}{3}$  in distance between anal and caudal fins. Post-humeral keel very obtuse and short, not extending beyond base of ventral. Scutes on body rough and spinulose but not keeled; lat. l. 25; 14 scutes between the anal and caudal fins. Uniform olive above, white beneath.

Total length 240 millim.

A single specimen from Paraguay.

This species appears to be nearest allied to *P. francisci*, Lütk., which is only known to me from the description.

7. *CHÆTOSTOMUS GIGAS*, sp. n.

15 upper and 19 lower teeth on each side. Depth of body  $4\frac{1}{2}$  times in total length, length of head  $2\frac{3}{5}$  times. Head a little longer than broad, entirely rough with small spines; snout broadly rounded; diameter of eye 11 times in length of head,  $4\frac{2}{3}$  times in interorbital width, 6 times in length of snout; anterior border of orbit with enlarged spinules; no postorbital groove; erectile præopercular spines very strong, the longest  $2\frac{1}{2}$  diameter of orbit; barbel a little longer than diameter of orbit. Throat and belly studded with small rough shields. Dorsal I 10; all the rays rough with spinules, the first measuring  $\frac{2}{3}$  length of head. Pectoral spine as long as head, covered with small spines, the longest of which are hooked and nearly equal diameter of orbit. Ventral I 5, as long as first dorsal ray. Anal I 5. Caudal obliquely truncate, lower ray longest. Shields on body rough with ridges of strong spinules, 25 in a longitudinal series. Brown, densely covered all over with round black spots.

Total length 530 millim.

A single specimen from Paraguay.

This fish, the largest known of the genus, is possibly the adult of *C. aculeatus*, Perugia, in which, however, the ventral region is entirely naked.

8. *HYPOPTOPOMA GUENTHERI*, sp. n.

Head not narrowed behind the eyes, its width equal to length of posterior border of orbit, its length  $2\frac{3}{4}$  to 3 times in total; diameter of orbit 5 to  $5\frac{1}{2}$  times in length of head,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in length of snout, 3 to  $3\frac{1}{2}$  times in interorbital width; barbel very small; head-shields as in *H. thoracatum*. Dorsal I 6, first ray as long as head to upper angle of gill-cleft. Pectoral as long as first dorsal ray, extending as far as ventrals, not reaching anal. Caudal deeply notched, middle rays half as long as outer. Two pairs of large, transverse pectoral shields, preceded by a transverse series of four small shields, the outer of which are in contact with the suborbital shields; three or four large ventral shields on each side, the anterior of which are usually separated by an azygos shield. Shields on body spinulose but not keeled, 20 to 22 on each side; 3 shields between the occipital and the dorsal, 12 between the dorsal and the caudal. Olive; dorsal and caudal fins with black spots, which may form two curved bands on the lower lobe of the caudal.

Total length 65 millim.

Numerous specimens from Descalvados, Matto Grosso.

The fish described and figured by Steindachner as *H. thoracatum*, Gthr., belongs to a distinct species, for which I propose the name *H. steindachneri*. His *H. bilobatum* is distinct from Cope's, which

I regard as identical with *H. thoracatum*, and is the same as that for which I propose the name *H. guentheri*. In fact 3 species are confounded under *H. thoracatum* in Dr. & Mrs. Eigenman's Synopsis; they are distinguishable as follows:—

- I. Throat entirely naked in front of the two pairs of pectoral shields; 6 to 8 pairs of ventral shields separated by a series of azygos shields; spine of adipose fin present; caudal deeply emarginate, middle rays half as long as outer. *H. thoracatus*, Gthr.
- II. A transverse series of four shields in front of the pectoral shields; 3 to 7 pairs of ventral shields and a single azygos shield in front; posterior dorsal spine usually absent.
- Pectoral spine not reaching origin of anal; caudal deeply emarginate, middle rays half as long as outer ..... *H. guentheri*, Blgr.
- Pectoral spine reaching origin of anal; caudal less deeply emarginate, middle rays much more than half as long as outer..... *H. steindachneri*, Blgr.

#### 9. LORICARIA PARVA, sp. n.

Teeth small, well developed in both jaws. Head  $1\frac{1}{2}$  as long as broad,  $4\frac{2}{3}$  to 5 times in total length; snout obtusely pointed, feebly projecting beyond the lip; head-shields with longitudinal, spinulose striæ, without keels; diameter of orbit  $5\frac{1}{2}$  to 6 times in length of head,  $2\frac{1}{2}$  to  $2\frac{2}{3}$  times in length of snout,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  in interorbital width; a broad postorbital notch; lower labial fold moderately large, papillose, feebly notched, with a fringe of obtuse papillæ. Dorsal I 7; first ray  $1\frac{1}{4}$  to  $1\frac{1}{3}$  as long as head, just above base of ventral. Pectoral I 6, as long as head or a little shorter, reaching beyond base of ventral. Ventral I 5, as long as pectoral, reaching beyond origin of anal. Anal I 5. Outer caudal rays much produced, filiform, upper longest. Lateral scutes 26–28, with two spinose ridges approximating on the 13th or 14th; nuchal shields without keels; 16 or 17 scutes between dorsal and caudal, 14 or 15 between anal and caudal. Breast and belly shielded; pectoral shields numerous, polygonal, irregular; ventrals 7 to 9 transversely enlarged ones on each side and 3 series of small ones in the middle. All the shields spinulose and striated. Olive above, with ill-defined dark cross-bars; a dark streak on each side of the snout, from the tip to the eye; fins with dark spots.

Total length 110 millim.

Numerous specimens from Descalvados, Matto Grosso.

This species is most nearly related to *L. filamentosa*, Stdr.

#### 10. LORICARIA LABIALIS, sp. n.

Teeth minute, rudimentary, in both jaws. Head  $1\frac{2}{5}$  as long as broad,  $4\frac{1}{2}$  to  $4\frac{3}{4}$  times in total length; snout obtusely pointed, feebly projecting beyond the lip; head-shields rough with villose spinules, except on the edge of the end of the snout, without



keels; diameter of orbit 6 to  $6\frac{1}{2}$  times in length of head, 3 times in length of snout,  $1\frac{1}{2}$  in interorbital width; a broad postorbital notch; lower labial fold moderately large in females, very large and extending to the pectoral shields in males, without notch and without fringe. Dorsal I 7; first ray nearly as long as head, just above base of ventral. Pectoral I 6, as long as head to posterior border of orbit, not reaching base of ventral. Ventral I 5, as long as pectoral, reaching origin of anal. Anal I 5. Upper caudal ray produced in a short filament. Lateral shields 30, with two spinose ridges approximating on the 21st or 22nd; nuchal shields without keels; 18 shields between dorsal and caudal, 16 between anal and caudal. Breast and belly shielded; pectoral shields numerous, polygonal, irregular; ventrals 4 to 6 transversely enlarged ones on each side, and one or two series of smaller ones in the middle. All the shields finely granulate and spinulose. Olive above; dorsal and caudal with small dark spots along the rays; pectorals and ventrals blackish.

Total length 220 millim.

Three specimens from Paraguay.

This species is allied to *L. nudirostris*, Kner, and *L. spixii*, Stdr.

#### 11. LORICARIA APELTOGASTER, sp. n.

A few slender teeth in both jaws. Head slightly longer than broad, 5 times in total length; snout acutely pointed, feebly projecting beyond the lip; head-shields strongly spinulose; occipital shield with two closely approximated, parallel keels; diameter of orbit  $7\frac{1}{2}$  to 8 times in length of head, 4 times in length of snout,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  in interorbital width; no postorbital notch; lower labial fold rather large, with long fringes; barbel long. Dorsal I 7; first ray a little longer than the head, just above base of ventral. Pectoral I 6; first ray more or less produced, at least as long as the head, reaching much beyond base of ventral. Ventral I 5; first ray produced, but shorter than pectoral, reaching much beyond origin of anal. Anal I 5. Upper caudal ray produced in a very long filament. Lateral shields 31 or 32, with two spinose ridges uniting on the 17th to 20th; nuchal shields bicarinate; 21 or 22 shields between dorsal and caudal, 19 or 20 between anal and caudal. Breast and belly naked, or with small stellate shields; a series of 6 to 8 small transverse shields may be present on each side of the belly. All the shields finely granulate and spinulose. Pale brown above, with three or four darker cross-bars on the body and two on the head; fins partially blackish.

Total length 210 millim.

Four specimens from Paraguay.

This fish is allied to *L. nudiventris*, C. & V., *L. evansii*, Blgr., and especially to *L. macrodon*, Kner.

#### 12. TETRAGONOPTERUS TERNETZI, sp. n.

Depth of body  $1\frac{3}{4}$  to  $1\frac{4}{5}$  in total length; length of head  $3\frac{1}{2}$  to  $3\frac{2}{3}$  times. Diameter of eye  $2\frac{1}{3}$  to  $2\frac{1}{2}$  times in length of head, twice

length of snout, equal to interorbital width; maxillary toothless, extending to below anterior border of eye. Dorsal 11, originating behind vertical of ventrals, longest rays as long as head. Anal 40-42, deepest anteriorly, longest rays a little shorter than head. Caudal bifurcate. Scales 30-33  $\frac{7-8}{8-9}$ ; lateral line complete. Pale brownish, upper surface of head, dorsal, anal, and lower part of caudal region of body blackish; two blackish vertical bands on upper half of body, the first behind the head, the second below the origin of the dorsal fin.

Total length 45 millim.

Several specimens from Descalvados, Matto Grosso.

### 13. TETRAGONOPTERUS ULREYI, sp. n.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in total length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$  times. Diameter of eye half length of head, twice length of snout, equal to interorbital width; maxillary toothless, extending to below anterior third of eye. Dorsal 10, originating behind base of ventrals, longest rays as long as head. Anal 23-25, anterior rays elongate, a little shorter than the head. Caudal bifurcate. Scales 32-33  $\frac{6}{4}$ ; lateral line reduced to 8 or 9 scales. Yellowish, with a small black humeral spot, a black line along the middle of the side, and a black line along the base of the anal fin; dorsal blackish at the end.

Total length 35 millim.

Several specimens from Descalvados, Matto Grosso.

The species is named after Prof. A. B. Ulrey, the author of a very useful key to the determination of the species of this genus.

### 14. ANACYRTUS PROGNATHUS, sp. n.

Depth of body  $2\frac{1}{5}$  in total length, length of head 4 times. Snout strongly projecting beyond the mouth, squarely truncate, with two strong tooth-like spines pointing outwards and forwards; several smaller teeth on each side of the upper jaw and two on each side of the lower; diameter of eye  $\frac{1}{4}$  length of head,  $1\frac{1}{2}$  in length of snout,  $1\frac{1}{4}$  in interorbital width; maxillary extending to below anterior third of eye; upper profile of head very concave. Dorsal 11, equally distant from eye and base of caudal, longest rays a little shorter than head. Anal 52. Caudal deeply forked. Yellowish, with a silvery lateral stripe; end of snout and a small spot at base of caudal blackish.

Total length 125 millim.

A single specimen.

This paper will be published entire in the Society's 'Transactions,' with illustrations of the new species.

The following papers were read:—

1. An Account of the Reptiles and Batrachians collected by Dr. A. Donaldson Smith in Western Somali-land and the Galla Country. By G. A. BOULENGER, F.R.S.

[Received June 11, 1895.]

(Plates XXIX. & XXX.)

In the following pages I have given a list of all the species of Reptiles and Batrachians represented in the rich series entrusted to me for identification. Types of the new species will be presented to the British Museum by Dr. Donaldson Smith.

For an account of the route traversed by Dr. Donaldson Smith, the reader is referred to his papers and maps in the 'Geographical Journal,' iv. 1894, p. 528, and v. 1895, p. 124: also to the following papers for previous contributions dealing with the Reptiles of the region:—

1. VAILLANT, L.—Reptiles et Batraciens in G. RÉVOIL, 'Faune et Flore du Pays Comalis.' (Paris, 1882.) 25 pp., 3 pls.
2. MOCQUARD, F.—"Sur une Collection de Reptiles et de Batraciens rapportés du Pays Comalis et de Zanzibar par M. G. Révoil." *Mém. Cent. Soc. Philom.* 1888, pp. 109–134, pls. xi. & xii.
3. BOULENGER, G. A.—"On some Reptiles collected by Signor L. Bricchetti Robecchi in Somaliland." *Ann. Mus. Genova*, (2) xii. 1891, pp. 5–15, pl. i.
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I have not in every case been able to give the locality of the specimens, as the labels are occasionally missing or only bear the date. The collection formed prior to September is from Somaliland proper, the rest from Galla, or Western Somali-land, of which district a map is given on p. 125 of the 'Geographical Journal,' vol. v. The localities are entered in conformity with those given by Dr. Bowdler Sharpe in his paper on the Birds (see above, p. 457).



2a



1a



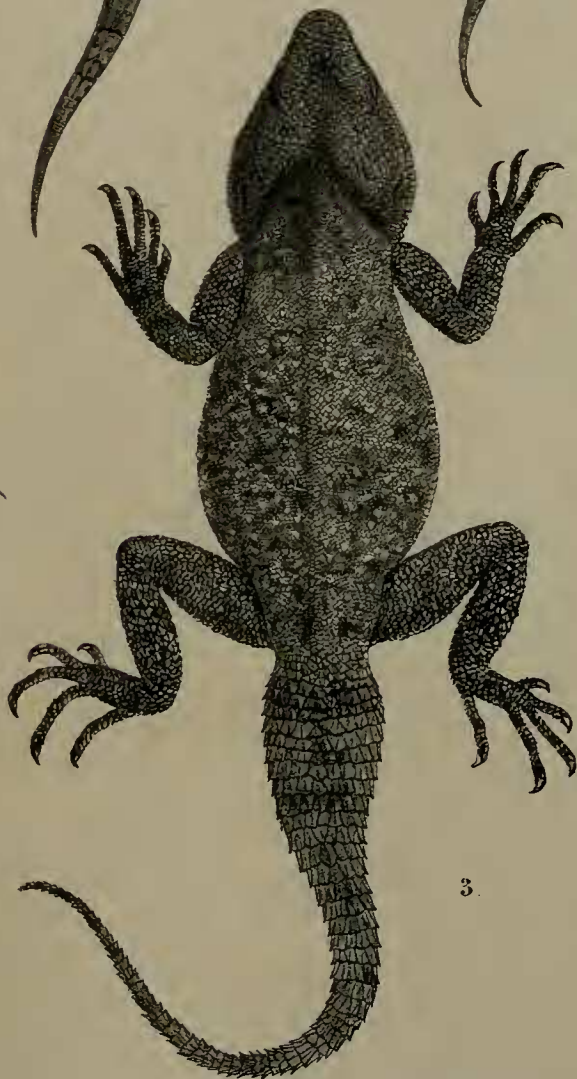
2



1



4



3

R. Minton & J. G. del. et lith.

Minton Bros. imp.

1. HEMIDACTYLUS ISOLEPIS. 2. HEMIDACTYLUS SMITHII.

3. AGAMA ZONURA. 4. EREMIAS SMITHII.





R. Minton & J. G. del. et lith.

Minton Bros. imp.

1. TYPHLOPS SOMALICUS 2. ZAMENIS SMITHII. 3. PSAMMOPHIS PULCHER. 4. ARTHROLEPTIS MINUTUS. 5. BUFO DODSONII.



## REPTILES.

## CHELONIANS.

## 1. PELOMEDUSA GALEATA, Schoepff.

A single young specimen (Mount Kuldush, 18.12.94). On the left side, the pectoral shield reaches the median line, whilst on the right the humeral and abdominal shields are narrowly in contact. The specimen is therefore intermediate between the typical form and *P. gehafice*, Rüpp.

## LIZARDS.

## 2. PRISTURUS FLAVIPUNCTATUS, Rüpp.

Milmil, 27.7.94.

## 3. PRISTURUS CRUCIFER, Val.

Between Hargeisa and Milmil, 22.7.94.

## 4. HEMIDACTYLUS ISOLEPIS, sp. n. (Plate XXIX. fig. 1.)

Head scarcely depressed, twice as long as broad; snout longer than the distance between the eye and the ear-opening; forehead with a very slight concavity; ear-opening very small, roundish. Body and limbs moderate. Digits moderately dilated, free, with rather short distal joints; 5 lamellæ under the thumb, 6 or 7 under the fourth finger, and the same number under the toes. Head covered with convex granules, largest on the snout; rostral subquadrangular, not twice as broad as deep, with median cleft above; nostril pierced between the rostral and four scales, the upper of which is largest and in contact with its fellow behind the rostral; 8 upper and 7 lower labials; symphysial large, pentagonal, twice as long as the adjacent labials; four chin-shields, median pair largest and forming a suture behind the symphysial. Body covered with equal, rounded, imbricate, smooth scales, about 65 round the middle of the body. Male with an angular series of six præanal pores. Tail cylindrical, tapering, covered with uniform scales similar to but a little larger than those on the body. Pale brown above, with dark brown irregular spots and scattered white dots; a dark brown streak on each side of the head and neck, passing through the eye.

	millim.		millim.
Total length . . . . .	78	Fore limb . . . . .	13
Head . . . . .	12	Hind limb . . . . .	16
Width of head . . . . .	6	Tail . . . . .	38
Body . . . . .	28		

A single male specimen. Turfa, 13.8.94.

This species is closely allied to *H. homœolepis*, Blanf., from Socotra (P. Z. S. 1881, p. 464), which differs in the much smaller dorsal scales, and to which specimens from Somali-land have been referred by Boettger. *H. tropidolepis*, Mocq., from Somali-land, appears, from



the description, to approach *Bunocnemis modesta*, Gthr., discovered by Dr. Gregory at Ngatana, but differs in the keeled dorsal scales.

5. *HEMIDACTYLUS SMITHI*, sp. n. (Plate XXIX. fig. 2.)

Head much depressed, once and three fifths as long as broad; snout rounded, longer than the distance between the eye and the ear-opening, once and one third the diameter of the orbit; forehead concave; ear-opening small, oval, oblique. Body and limbs moderate. Digits moderate, inner well-developed; 6 or 7 lamellæ under the inner digits, 9 or 10 under the third and fourth. Head covered with granules of unequal size; rostral four-sided, nearly twice as broad as deep, with median cleft above; nostril pierced between the rostral, the first labial, and three small scales; 13 or 14 upper and 10 lower labials; symphysial triangular, broader than long, but little longer than the adjacent labials, followed by two rows of small chin-shields, two in the anterior, three in the posterior. Upper surface of body and limbs covered with small granules intermixed with moderately large, round, flat granules irregularly disposed; belly covered with imbricate, roundish, smooth scales. A series of 12 femoro-præanal pores on each side. Tail slightly depressed, tapering, with transverse series of large, smooth, flat tubercles; below with a series of transversely dilated shields. Grey above, with transverse angular cross-bars, finely edged with black behind, on the body; lower parts white.

	millim.		millim.
Total length . . . . .	86	Fore limb . . . . .	17
Head . . . . .	14	Hind limb . . . . .	21
Width of head . . . . .	8.5	Tail . . . . .	39
Body . . . . .	33		

A single, half-grown specimen. Shebeli, 5.9.94.

Intermediate between *H. frenatus*, D. & B., and *H. jubensis*, Blgr.

6. *HEMIDACTYLUS SINAITUS*, Blgr.

I refer two specimens (Boholgarshan, 4.7.94) to this species, as defined by Dr. Anderson (below, p. 639), although a series of enlarged subcaudals is present. The first labial is excluded from the nostril by a small shield. 5 lamellæ under the inner toe, 9 under the fourth. 6 præanal pores. The dorsal tubercles quite as large as in the typical *H. turcicus*.

7. *HEMIDACTYLUS BROOKII*, Gray.

Sheikh Mahomed.

This common West African Gecko was found at Wadelai by the late Emin Pasha, and in the Kibibi Basin by Dr. Gregory. It probably extends right across the Soudan.

8. *AGAMA VAILLANTI*, Blgr.

Dr. Donaldson Smith's collection contains three specimens of

this well-marked species, recently discovered in Somali-land by Capt. Bottego. They agree well with the type in their markings, but the ground-colour of the upper parts is a pale reddish brown and the vertebral streak grey. 28 to 30 scales on the vertebral line between the origin of the fore limbs and the origin of the hind limbs, and 60 to 63 round the middle of the body.

Sassabana, 2.8.94; Shebeli, 30.12.94.

9. *AGAMA DORLE*, Blgr.

Sheikh Husein, 22.9.94.

10. *AGAMA CYANOGASTER*, Rüpp.

11. *AGAMA ANNECTENS*, Blanf.

Bearso, 19.12.94; Sunerdarler, 28.12.94.

12. *AGAMA ZONURA*, sp. n. (Plate XXIX. fig. 3.)

Head much depressed, triangular. Nostril lateral, not tubular, below the canthus rostralis. Head-scales very unequal in size, smooth or obtusely keeled; occipital not enlarged; a few enlarged, conical scales below and behind the ear; 11 or 12 upper and 10 or 11 lower labials; tympanum entirely exposed, larger than the eye-opening. No gular pouch. Body much depressed; above with small irregular scales intermixed with irregularly scattered, enlarged, obtusely keeled ones; no crest; ventral scales small, smooth. The adpressed hind limb reaches the ear; tibia shorter than the skull; fourth finger slightly longer than third; fourth toe very slightly longer than third, fifth extending beyond first. Tail a little longer than head and body, much depressed at the base; scales large, edged with spinules and with a small median spine, arranged in rings two of which form a well-marked segment except in the posterior third of the tail, where each segment comprises three transverse series above and two below. Male with three transverse series of anal 'pores.' Dark olive above, with some lighter dots and black marblings; blue beneath, throat and breast with a rather indistinct blackish network; anal 'pores' yellow.

	millim.		millim.
Total length.....	160	Fore limb.....	35
Head.....	19	Hind limb.....	48
Width of head....	19	Tail.....	85
Body.....	56		

A single male specimen. Wardergubberner, 13.11.94.

This species is a true '*Stellio*' and connects that section of the genus *Agama* with the one of which the following species is the type.

13. *AGAMA BATILLIFERA*, Vaill.

A single female specimen, from Sassabana, measuring 76 millim.

to the vent, tail 15 (imperfect). One of the types, a male, collected by M. Révoil, is now in the British Museum.

This very curious Lizard was originally described as a *Uromastix* allied to *U. princeps*, O'Sh., which is the type of my genus *Aporoscelis*. In all respects, except the shape of the tail, it is, however, a true *Agama* and is well distinguished by its dentition from *Uromastix* and *Aporoscelis*, as was first pointed out to me by my friend Dr. Anderson.

I cannot consider the shape of the tail, in this instance, as warranting generic separation, and following the precedent laid down in dealing with the Iguanoid genera *Ctenosaura* and *Cachrys* (Proc. Zool. Soc. 1886, p. 241), and the Scincoid *Egernia* (Cat. Liz. iii. p. 134), I have no hesitation in placing *Uromastix batilliferus* in the genus *Agama*. But it may be regarded as the type of a distinct section or subgenus, for which I propose the name *Xenagama*, characterized by the extreme flattening and abbreviation of the tail.

14. *VARANUS OCELLATUS*, Rüpp.

Goulf, 29.11.94.

15. *LATASTIA LONGICAUDATA*, Reuss.

Goulf, 29.11.94.

Two specimens, male and female. 60 or 61 scales across the middle of the body. The male has 7 femoral pores on each side, the female 6.

16. *EREMIAS SEXTÆNIATA*, Stejneger.

The exclusion of the subocular from the lip and the absence of a light vertebral streak distinguish this Lizard from *E. spekii*, Gthr.

17. *EREMIAS MUCRONATA*, Blanf.

18. *EREMIAS SMITHI*, sp. n. (Plate XXIX. fig. 4.)

Head much depressed; snout pointed, shorter than in *E. brenneri* and *mucronata*. Upper head-shields rugose; nasals feebly swollen, lower divided, the nostril pierced between four shields; frontonasal as long as broad, separated from the rostral; two præfrontals; frontal strongly grooved; three large supraoculars, second and third forming together an oval disc surrounded with granules; a small interparietal in contact with a small occipital; an elongate shield on the outer border of the parietals; temporal scales granular, smooth; no auricular denticulation; lower eyelid scaly; subocular not reaching the lip, resting on the sixth and seventh labials; the two first labials in contact with the nasals; the two anterior pairs of chin-shields in contact. Collar curved, perfectly free, with 7 plates. Scales finely granular, juxtaposed, smooth, slightly larger on the sides, 75 across the middle of the body. 8 straight longitudinal series of ventral plates, with an

outer series of smaller, imperfectly developed plates; 30 straight transverse series. Præanal region covered with small shields. The hind limb reaches the posterior border of the orbit; toes strongly compressed; foot as long as the distance between the arm and the end of the snout; one series of large and one of small subtibial scales; upper crural scales much larger than dorsals, rhomboidal, subimbricate, keeled. 19 femoral pores on each side. Back brick-red, with numerous small round white spots edged with grey, and four pale reddish-brown longitudinal streaks, the outer of which extend to the eyes; head pale reddish brown above, white on the sides; limbs brown with round pale spots; lower parts white.

	millim.		millim.
Total length . . . . .	126	From end of snout	
Head . . . . .	11	to vent. . . . .	46
Width of head . . . . .	7	Fore limb . . . . .	16
From end of snout		Hind limb . . . . .	32
to fore limb . . . . .	17	Tail (reproduced) . . . . .	80

A single male specimen. Milmil, 27.7.94.

In the number of rows of ventral plates this *Eremias* agrees with *E. erythrostickta*, Blgr., from which it is easily distinguished by the shorter head with rugose shields.

19. *MABUIA MEGALURA*, Peters.

Several specimens. Sheikh Husein and Sheikh Mahomed, Sept. 94. Scales in 24 or 26 rows. Four black lines along the back (*E. massaianus*, Fischer).

20. *MABUIA VARIA*, Peters.

Sheikh Husein.

21. *MABUIA STRIATA*, Peters.

Milmil, 27.7.94.

22. *LYGOSOMA MODESTUM*, Gthr.

Sheikh Husein, 4.10.94.

23. *LYGOSOMA SUNDEVALLII*, Smith.

Two specimens, with 26 scales round the body. Sheikh Husein, 4.10.94.

24. *CHALCIDES OCELLATUS*, Forsk.

Berbera. A single specimen of the typical form, with 28 scales round the body.

25. *CHAMÆLEON GRACILIS*, Hallow.

Sibbe, 4.8.94; Smith River, 11.9.94; Sheikh Mahomed.

26. *CHAMÆLEON AFFINIS*, Gray.

Rokar, 11.10.94; Sheikh Mahomed, 28.10.94.

## SNAKES.

27. *TYPHLOPS SOMALICUS*, sp. n. (Plate XXX. fig. 1.)

Snout very prominent, obtusely pointed, with sharp cutting-edge and inferior nostrils. Head-shields granulated; rostral very large, its upper portion a little longer than broad, its lower portion as broad as long; nasal completely divided, the cleft proceeding from the second labial; præocular present<sup>1</sup>, nearly as large as the ocular, in contact with the second and third labials; ocular in contact with the third and fourth labials; eyes not distinguishable; præfrontal and supraoculars transversely enlarged. Diameter of body 90 times in total length; tail a little broader than long, ending in a small spine. 24 scales round the body. Pale olive, head yellowish.

Total length 450 millim.

A single specimen, Bearso, 19.12.94. . . .

Most nearly allied to *T. crossi*, Blgr., from the Lower Niger.

28. *BOODON LINEATUS*, D. & B. . . .

Three specimens. Sheikh Husein, 25.9.94; between Fehja and Tooloo, 24.11.94.

The largest, a male, has two præoculars on the left side and one on the right, and 27 scales across the body. The two others, young, have a single præocular and 29 and 31 scales respectively.

29. *LYCOPHIDIUM ABYSSINICUM*, Blgr.

Sheikh Husein, 8.10.94.

A single specimen, 185 millim. long. Ventrals 203; subcaudals 31.

30. *ZAMENIS SMITHI*, sp. n. (Plate XXX. fig. 2.)

Snout obtuse, feebly projecting. Rostral once and a half as broad as deep, the portion visible from above measuring one fourth its distance from the frontal; internasals as long as the præfrontal; frontal broader than the supraocular, once and two fifths as long as broad, longer than its distance from the end of the snout, shorter than the parietals; loreal longer than deep; one præocular, in contact with the frontal, with one or two suboculars below it; two postoculars; temporals 2+2; nine (exceptionally ten) upper labials, fifth and sixth (or sixth and seventh) entering the eye; four or five lower labials in contact with the anterior chin-shields; posterior chin-shields as long as or longer than the anterior and separated from each other by two series of scales. Scales smooth, in 21 rows. Ventrals very obtusely angulate laterally, 180-185; anal divided; subcaudals 100. Uniform pale buff above, pinkish on the sides; a greyish blotch below the eye and another across the temple; white beneath.

Total length 560 millim.; tail 170.

Two specimens, male (V. 180; C. 100) and female (V. 185; C.?). Shebeli, 23.8.94; 16.1.95.

<sup>1</sup> Absent on the left side, by anomalous fusion,

Intermediate between *Z. florulentus*, Geoffr. (Sc. 21; V. 201-228; C. 82-100), and *Z. brevis*, Blgr. (Sc. 19; V. 159; C. 76).

31. AMPLORHINUS NOTOLENIA, Gthr.

A single specimen, in bad condition.

32. HEMIRHAGERRHIS KELLERI, Bttgr.

A single female specimen. Sunerdarler, 23.12.94.  
Sc. 17; V. 153; A. 2; C. 73.

33. PSAMMOPHIS SIBILANS, L.

Two specimens. Sheikh Husein, 8.10.94.

Like the typical form from Egypt, but without longitudinal lines on the body; head with the yellowish, black-edged markings well-defined; each upper labial with a brown spot; lower third of outer row of scales white. V. 161, 168; C. 106, ?.

34. PSAMMOPHIS PUNCTULATUS, D. & B.

Turfa, 21.8.94.

A single male specimen, agreeing with the one recently figured in *Ann. Mus. Genova*, (2) xv. pl. iv.

Head reddish above. 8 upper labials on the right side (fourth and fifth entering the eye), 9 on the left. V. 180; C. 156.

35. PSAMMOPHIS BISERIATUS, Ptrs.

Four specimens. Shebeyli, 5.9.94; Turfa, 24.12.94.  
Ventrals 147-164; anal divided; subcaudals 100-103.

36. PSAMMOPHIS PULCHER, sp. n. (Plate XXX. fig. 3.)

Snout once and two thirds as long as the eye. Rostral broader than deep, visible from above; nostril between two shields; internasals much shorter than the præfrontals; frontal twice and a half as long as broad, a little narrower than the supraocular, longer than its distance from the end of the snout, nearly as long as the parietals; loreal once and two thirds as long as deep; two præoculars, upper not reaching the frontal; two postoculars; temporals 1+2; eight upper labials, third deeper than fourth, fourth and fifth entering the eye, fifth as long as the eye; four lower labials in contact with the anterior chin-shields, which are a little shorter than the posterior. Scales in 13 rows. Ventrals 144; anal divided; subcaudals 108. Pale brownish above, with an orange black-edged vertebral stripe and a black lateral streak, running along the second row of scales and extending to the end of the snout after passing through the eye; upper lip, outer row of scales, and outer ends of ventrals white; ventrals yellow in the middle, with an orange line on each side.

Total length 435 millim.; tail 160.

A single female specimen. Webi Shebeli, 24.12.94.

This species fills up the gap between *P. biseriatus*, Ptrs., and *P. angolensis*, Bocage. It is therefore a highly interesting addition

to our knowledge of this genus. I am now able to define 17 species, for the determination of which the following synopsis has been prepared :—

*Synopsis of the Species of Psammophis.*

I. Scales in 17 rows, exceptionally 19.

A. Rostral a little broader than deep, well visible from above.

1. Anal entire; eight upper labials, fourth and fifth entering the eye.

One præocular; five lower labials in contact with the anterior chin-shields; ventrals 170-185; subcaudals 92-97 .....

1. *leithii*, Gthr.

Two præoculars; four lower labials in contact with the anterior chin-shields; ventrals 157-171; subcaudals 81-104 .....

2. *notostictus*, Ptrs.

2. Anal divided.

a. Five or six lower labials in contact with the anterior chin-shields; usually nine upper labials, fifth and sixth entering the eye; præocular in contact with the frontal; ventrals 162-197.

Sixth upper labial shorter than the eye, which is more than half the length of the snout; subcaudals 93-149 .....

3. *lachrymans*, Reuss.

Sixth (exceptionally fifth) upper labial as long as the eye, which is more than half the length of the snout; subcaudals 130-158 .....

4. *punctulatus*, D. & B.

Sixth upper labial as long as the eye, which is half the length of the snout; subcaudals 132 .....

5. *trigrammus*, Gthr.

b. Four lower labials in contact with the anterior chin-shields; eight or nine upper labials; ventrals 151-168; subcaudals 100-108 .....

6. *subtæniatus*, Ptrs.

B. Rostral as deep as broad, well visible from above.

1. Nine upper labials, three entering the eye; ventrals 161-173; subcaudals 109-127...

7. *bocagii*, sp. n. (Angola).

2. Eight upper labials, exceptionally seven or nine, two entering the eye.

a. Frontal, in the middle, narrower than the supraocular; ventrals 157-198; subcaudals 90-116.

Præocular narrowly in contact with or separated from the frontal, which is as long as or longer than its distance from the end of the snout.....

8. *sibilans*, L.

Præocular extensively in contact with the frontal; snout short, forehead strongly grooved.....

9. *furcatus*, Ptrs.

Præocular separated from the frontal, which is considerably shorter than its distance from the end of the snout .....

10. *longifrons*, Blgr.

b. Frontal, in the middle, nearly as broad as the supraocular; præocular not reaching the frontal.

Snout nearly twice as long as the eye; ventrals 156-182; subcaudals 75-90 .....

11. *condanarus*, Merr.

- Snout once and a half to once and two thirds as long as the eye; ventrals 153-163; subcaudals 64-95 ..... 12. *brevirostris*, Ptrs.
- C. Rostral a little broader than deep, scarcely visible from above; snout twice to twice and a half as long as the eye; nine upper labials, fifth and sixth entering the eye; ventrals 179-202; subcaudals 144-161..... 13. *elegans*, Shaw.
- II. Scales in 15 rows.
- Nine or ten upper labials (rarely eight); ventrals 142-164; subcaudals 100-131 ..... 14. *biseriatus*, Ptrs.
- Eight upper labials (rarely seven); ventrals 136-155; subcaudals 62-81 ..... 15. *crucifer*, Daud.
- III. Scales in 13 rows; ventrals 144; subcaudals 108..... 16. *pulcher*, sp. n.
- IV. Scales in 11 rows; ventrals 141-155; subcaudals 57-81 ..... 17. *angolensis*, Bocage.

### 37. RHAMPHIOPHIS OXYRHYNCHUS, Reinh.

Two specimens. Booree, 27.11.94.  
V. 171, 170; C. ?, 109.

### 38. CAUSUS RHOMBEATUS, Licht.

Two specimens. Sheikh Husein, 16.9.94; Durro, 2.12.94.  
Sc. 20; V. 158, 166; C. 27, 25.

### 39. ATRACTASPIS MICROLEPIDOTA, Gthr.

A single female specimen. Tooroo, 5.1.95.  
Sc. 31; V. 252; A. 1; C. 28, single.

## BATRACHIANS.

### 1. RANA DELALANDII, D. & B.

Tuago, 27.10.94; Webi Shebeli, 24.12.94; Sheikh Husein, 25.9.94.

### 2. RANA MASCARENIENSIS, D. & B.

Tooroo, 5.1.95; 16.1.95.

### 3. ARTHROLEPTIS MINUTUS, sp. n. (Plate XXX. fig. 4.)

Tongue with a free papilla in the middle. Head moderate, as long as broad; snout rounded, a little shorter than the diameter of the orbit; canthus rostralis rounded; tympanum hidden. Fingers and toes blunt; first finger shorter than second; toes webbed at the base, the web extending as a fringe to the tip; a tarsal tubercle; a small, oval inner metatarsal tubercle; sub-articular tubercles strong. The tibio-tarsal articulation reaches the posterior border of the eye. Skin smooth. Blackish brown above, whitish beneath; a fine whitish vertebral line. Male with a subgular vocal sac.

From snout to vent 16 millim.

A single male specimen. Durro, 2.12.94,



4. *CHIROMANTIS PETERSII*, Blgr.

A fine female specimen, measuring 80 millim. from snout to vent. Darar, 15.9.94.

5. *CASSINA OBSCURA*, Blgr.

A single specimen from the Budda Plateau.

The tarso-metatarsal articulation reaches the shoulder. Toes one-third webbed. Skin nearly smooth above. Olive-green above, with dark liver-brown spots.

6. *CACOSTERNUM NANUM*, Blgr.

A single specimen. Durro, 2.12.94.

The occurrence so far north of this species, originally described from Caffraria (Ann. & Mag. N. H. [5] xx. 1887, p. 61), is surprising. Yet I have little doubt the determination is correct.

7. *BUFO REGULARIS*, Reuss.

Numerous; collected all along the route.

8. *BUFO DODSONI*, sp. n. (Plate XXX. fig. 5.)

Crown without bony ridges; snout short, blunt; interorbital space as broad as the upper eyelid; tympanum very distinct, two thirds the diameter of the eye. First finger considerably longer than second; toes one-third webbed, with single subarticular tubercles; two moderate metatarsal tubercles; a tarsal fold. The tarso-metatarsal articulation reaches the anterior border of the eye. Upper parts with numerous flat, distinctly porous warts; parotoids oval, flat, as long as their distance from the anterior border of the orbit. Pale olive above, with small darker spots; a dark canthal streak and a dark vertical bar below the eye; lower parts white. Male with an internal subgular vocal sac.

From snout to vent 53 millim.

A single male specimen. Rassa Alla, 6.10.94.

This species, which is allied to *B. viridis*, Laur., is named after Mr. E. Dodson, who accompanied Dr. Donaldson Smith as taxidermist.

9. *XENOPUS MUELLEI*, Ptrs.

Murgen (Salro), 12.11.94.

## EXPLANATION OF THE PLATES.

## PLATE XXIX.

- Fig. 1. *Hemidactylus isolepis*, p. 531. 1 a. Chin-shields,  $\times 3$ .  
 2. *Hemidactylus smithi*, p. 532. 2 a. Chin-shields,  $\times 3$ .  
 3. *Agama zonura*, p. 533.  
 4. *Eremias smithi*, p. 534.

## PLATE XXX.

- Fig. 1. *Typhlops somalicus*, p. 536. Upper and side views of head,  $\times 3$   
 2. *Zamenis smithi*, p. 536. 2 a. Side view of head.  
 3. *Psammodphis pulcher*, p. 537. 3 a. Side view of head.  
 4. *Arthroleptis minutus*, p. 539.  
 5. *Bufo dodsonii*, p. 540.

2. On the Moulting of the Great Bird of Paradise, with brief Notes upon its Habits in Captivity. By RAM BRAMHA SÁNYÁL, C.M.Z.S.

[Received May 27, 1895.]

In his remarks on the moulting of the Great Bird of Paradise (*Paradisæa apoda*), recorded in the P. Z. S. of April 1887 (p. 392), Mr. Bartlett questions the statement of Dr. Guillemard, made upon the authority of the inhabitants of the Aru Islands, that the Great Bird of Paradise "does not wear its adult plumage all the year, and that its beautiful plumes remain developed for not longer than two or three months."

I have had opportunities of observing the habits of two adult males of the Great Bird of Paradise for a sufficient length of time to justify me in stating that, although it is difficult to make the phenomenon fit in with our previous notion of the law of moulting in birds, it is nevertheless the fact that my observations regarding the moulting of this bird, extending over a period of four years, go to show that there is some truth in Dr. Guillemard's statement.

In January 1891, the Zoological Garden, Calcutta, was fortunate in having presented to it a male *Paradisæa apoda*, from the Aru Islands. It was then in perfect adult plumage. By the middle of February following I noticed that the bird was every now and then pecking at the feathers of its lower back, which was much dishevelled. Suspecting something wrong, I consulted Mr. William Rutledge, an experienced dealer in live stock at Calcutta, who had owned the bird for about two years previous to its acquisition by the Garden. He assured me that there was nothing wrong, but that the bird was beginning to moult. It went on throwing off its feathers slowly at first, but rapidly as the period of moult advanced, so that by the middle of May it had cast off all its beautiful side-plumes and tail-feathers, except the two central wire-like ones, which fell off later on. The short, close, velvety feathers of the head, neck, and throat were the last to fall off by the end of July, and the first to reappear a few days later. The bird did not, however, assume its perfect plumage until about the middle of October. With slight variations as to time, it has, every year since its arrival in 1891, been observed to remain more or less in undress, as it were, during the unusually prolonged period of moulting. During the current year it began throwing off its feathers early in February, and now (May 7th) not one of the long beautiful plumes is left. The two long wire-like central tail-feathers have not fallen, but are broken off at the middle.

In January 1892, another male bird of the same species, but said to have been from the southern part of New Guinea (and possibly, therefore, referable to *P. papuensis*), was acquired by purchase. It was slightly smaller and a little brighter in colour than the Aru-Island bird. During the two years that it remained alive its moulting-habits were carefully observed and found to vary

somewhat from the other bird. Briefly speaking, it did not begin throwing off its feathers until the summer was somewhat advanced, and took less time to complete its moult than the Aru-Island bird.

*Habits in captivity.*—Besides being active and vigorous, as stated by Wallace, the Great Bird of Paradise is amusing and demonstrative, possessing many of the characteristics of a Magpie and Bhimraj (*Dissemurus paradiseus*), but is liable to be stupid and helpless when the economy of its ordinary mode of life is in any way disturbed. At least such has been observed to be the case with the Aru-Island bird. It behaved in a very strangely stupid manner when let out in a large and lofty aviary a few days after its arrival. Perhaps the vastness of the place bewildered and frightened it. It, however, recovered its equanimity shortly after being placed in its old and accustomed cage. It is very fond of dancing, but want of company evidently acts as a check upon this passion. It has a loud and deep note, which it constantly utters with infinite variation and modulation. It maintains excellent health upon diet consisting of a teacupful of bread and milk in the morning, half a papaya-fruit in the forenoon, and a few grasshoppers or cockroaches the last thing in the afternoon. Its low subdued chuckles and grunts while taking the insects from off the fingers of the keeper clearly show its great insectivorous propensity. It very much enjoys a shower-bath, administered by a garden syringe, twice a week during summer. The smaller bird (said to have been from the southern part of New Guinea) was less demonstrative; but this might have been its individual peculiarity.

### 3. On the Mammals of Aden.

By Col. J. W. YERBURY and OLDFIELD THOMAS.

[Received May 29, 1895.]

The present paper is based on the collections made by Yerbury at and near Aden in February and March of this year, and, as there has been remarkably little recorded about the mammals of this southern point of Arabia, we have added to the list two species not represented in the collection, but mentioned by other authors, and have thus made the paper contain a complete list of the mammals as yet known to occur in the district of Aden.

The only two papers that we know of mentioning Aden mammals are:—

- (1) MONTICELLI, F. S. "Note Chiropterologica."<sup>1</sup> (1887.)  
[Description of *Vespertilio dogalensis*, and record from Aden of *Hipposiderus tridens*, *Nycteris thebaica*, *Rhinopoma microphyllum*, and *Xantharpyia straminea*.]
- (2) MATSCHIE, P. "Ueber einige von Herrn Oscar Neumann bei Aden gesammelte und beobachtete Säugethiere."<sup>2</sup> (1893.)  
[Notice of *Papio hamadryas*, *Xantharpyia straminea*, *Scotophilus schlieffeni*, and *Hystrix "africa-australis"*.]

<sup>1</sup> Ann. Mus. Genov. (2) v. p. 517.

<sup>2</sup> SB. Ges. nat. Freund. 1893, p. 24.

Examples of all the above-mentioned animals were collected by Yerbury, with the exception of the Baboon and Monticelli's new Bat, *Vespertilio dogalensis*; and he also obtained or observed examples of 29 additional species, bringing up the total to 36, a number which is more than could have been expected from so barren a place.

Of these additional species four are Gerbilles, all of which, to our surprise, prove to be quite distinct from any species found elsewhere, and have therefore had to be described as new.

On the whole, judging by the numbers of specimens of each sort brought home, we think it probable that there are not many more terrestrial species to be obtained at Aden, however many Bats or marine mammals may hereafter be found to occur there. At the same time, Yerbury believes that a second Fox and a second Hare are to be found in the district, while, as will be seen below, several animals, of the existence of which he has certain personal knowledge, escaped capture during his last visit.

The following account of the localities is contributed by Yerbury :—

The peninsula of Aden is situated in lat.  $12^{\circ} 47' N.$  and long.  $44^{\circ} 59' E.$ , and is, roughly speaking, five miles in its greatest length and three miles in breadth. The centre of the peninsula is formed by the Shum Shum Range, the highest peak of which rises to 1760 feet. From this range spurs run down to the sea, with deep ravines between them ending at the sea in sandy beaches. On the north side an elevated plateau lies between this range and the cantonment of Aden (the Crater); this plateau being deeply cut by watercourses, the greater number of which form the feeding-channels supplying the tanks. The peninsula is united to the mainland by a low, sandy, barren isthmus, about two miles long by three-quarters of a mile broad.

Near Shaik Othman, five miles from the Barrier Gate, the aspect of the country alters slightly, the plain being covered with salsola bushes, while round Shaik Othman itself a considerable amount of cultivation has sprung up in the last few years. Onwards inland the plain continues with some stunted salsola, baubal, and caper bushes—in a few places the baubals having grown into good-sized trees; and so with a few rolling sand-hills here and there the plain runs on until the outskirts of cultivation round Al Hautah (Lahej) are reached, about sixteen miles from the Barrier Gate. About three miles beyond this point the town of Al Hautah is arrived at, while eight miles beyond Al Hautah is Haithalhim, with the remains of an old garden; close by the river bifurcates, and it is between the branches of this fork that the bulk of the cultivation lies.

This oasis is very fertile and produces jowari, Indian corn, telli, and other crops; there are, too, a few gardens with almond, cocoanut, and other trees, and several groves of date-palms. From near Haithalhim to Zaidah (six miles) the river runs in a single bed; there is always water in this part of the river (though in dry seasons the water loses itself in both branches close to Haithalhim). There

is a good deal of cultivation in the bed, but the greater part of it is choked up with a growth of gigantic reeds. Away from the bed of the river the country on both sides is an absolute desert. About eight miles beyond Zaidah the outlying spurs of the mountains are reached. The rise of the land between the Barrier Gate and Zaidah is probably under 100 feet; the cliffs at Haithalhim and other places are quite 40 feet high, showing that the river has cut itself a bed to this depth in the soft soil.

The places collected at were Aden, Shaik Othman, Lahej, and Haithalhim, and all these places may be considered of the same altitude. Aden itself, *i. e.* the peninsula, is entirely composed of volcanic rock. The mammals are Monkeys, Foxes, an occasional Jackal, two species of Rat, a spiny Mouse, two species of Shrew, several species of Bat, and probably the Common Mouse, the Musk-Rat, and a species of Bandicoot. The greater part of the maritime plain inland has been at some period under the sea, but round Lahej a great amount of detritus brought down by the river has been deposited. The Arabic names of the various mammals met with are as follows:—

Monkey: *rubba*.

Fruit Bats: *sir*, or, perhaps nearer, the "Zumerset" *zur*.

*Nycteris thebaica*: *choef*, probably applied to all small Bats.

Fox: *darain*; occasionally *taleb*.

Hare: *ärnub*.

Hyena: *dhëb*.

Porcupine: *gendëbah*.

Gazelle: *dobbi*.

Ibex: *wedl*.

One other place may be worthy of notice, and that is the island in Ras Fakoum Bay beyond Little Aden. On this island is a large cavern, large enough to admit a ship's gig, which swarms with Bats. Three species were obtained there—*Coleura afra* in small colonies by themselves, and *Hipposideros tridens* and *Tricenops persicus* mixed up together. As the cave is lofty, all specimens have to be shot, and the walls of the cave rising straight out of the sea the specimens when shot fall into the water; this of course does not improve them as such.

One word as to the names of places visited: the name of the Arab town inland from Aden is Al Hautah, while the name Lahej appears applicable to the whole of the territory of the Abdali Tribe; but as it is always customary to talk of the town as Lahej, we have done so here.

All the specimens mentioned in this paper have been presented to the British Museum.

The determination of Arabian mammals presents in some ways unusual difficulty, owing to the fact that the Indian and African faunas meet here, and that species described from each, without reference to the other, often prove to be unexpectedly similar. Arabian animals may therefore often be apparently with equal

reason assigned to one or other of two forms usually supposed to be quite distinct.

This very difficulty, however, renders the present collection all the more valuable as an aid to future workers on the subject.

It may be noted that only two terrestrial non-volant species can be said to be distinctly African, namely, *Papio hamadryas* and *Arvicanthis variegatus*, while the same number (*Hystrix leucura* and, if correctly determined, *Gazella bennetti*) are Indian. The Bats are nearly wholly African.

#### 1. PAPIO HAMADRYAS (L.).

The Aden Monkey is recorded under this head by Matschie. No specimen was brought home by Yerbury, but one was seen at Haithalhim in March. In Aden itself the Lascars at the signal-station on the Shum Shum Range stated that a flock of 12 or 13 individuals frequented the crest of the ridge. Monkeys were heard near the last locality but not seen.

#### 2. XANTHARPYIA STRAMINEA, Geoffr.

*a-e.* 5 specimens. Lahej.

These Bats were plentiful in the Sultan's garden at Lahej on the occasion of the first visit on March 5: they frequent the tops of the tallest palm-trees, where they collect in large ball-like clusters, but are by no means easy to see; in fact, were it not for the characteristic Flying Fox chattering that they keep up incessantly they would probably be overlooked altogether. After being shot at on the above-mentioned date the bulk disappeared and only one or two stray specimens were seen up to date of departure from Lahej at the end of the month.

#### 3. XANTHARPYIA ÆGYPTIACA, Geoffr.

*a-i.* 9 specimens. Lahej. 21-29. III. 95.

In great numbers in a cave on the banks of the Wady Jughur near Lahej. A female, killed on the 29th, had a single young one at her breast, and other gravid females had single fœtuses only.

We use the name *ægyptiaca* provisionally, as there does not seem to be any tangible difference between these specimens and examples from Egypt; but the proper relationships of and differences between *X. ægyptiaca*, *X. amplexicaudata*, and *X. collaris* much need investigation with larger material.

#### 4. TRIÆNOPS PERSICUS (Dobson).

*a-e.* Cave on island in Ras Fakoum Bay (Little Aden). 6. IV. 95.

In great numbers at this locality on the above date. There were a few foxy-red specimens (one of which was obtained) to be seen among the others.

As to the cause of the foxy colour observable in certain individuals we are quite unable to make any suggestion. All the specimens

are males, and the one red individual does not appear to differ from the others in age or in the development either of its facial glands or reproductive organs<sup>1</sup>.

5. *HIPPOSIDERUS TRIDENS*, Geoffr.

*a, b.* Lahej. 3 and 27. III. 95.

*c-l.* Island in Ras Fakoum Bay, in cave. 6. IV. 95.

Although only two specimens of this Bat were obtained at Lahej it does not appear to be uncommon there. At the second locality it was very plentiful. Each gravid female contained a single foetus.

6. *NYCTERIS THEBAICA*, Geoffr.

*a-f.* Lahej. 3. III. 95.

*g.* Lahej. 6. III. 95.

*h-k.* Lahej. 18. III. 95.

This Bat was very plentiful in the bungalow at Lahej, and could always be caught during the small hours of the night in the bath-room with a butterfly-net. They fed on various species of orthoptera, a great number of wings of locusts and grasshoppers being littered about the floor below where they had been hanging to the rafters of the bath-room. This is an early flying Bat and follows (at Lahej) *H. tridens* soon after dusk. As usual, the gravid females had each only a single foetus.

7. *SCOTOPHILUS SCHLIEFFENI*, Peters.

*a, b.* Lahej. 12. III. 95.

Three of these Bats came into the bungalow at Lahej about 8 P.M. on the above date, two of which were caught in the butterfly-net. This was the only occasion the species was met with.

In using the word *Scotophilus* we provisionally accept the opinion of Dr. Harrison Allen as to the distinctness from each other of the American and Old World members of the group, to which if united the name *Nycticejus* would apply.

8. *VESPERTILIO (LEUCONOE) DOGALENSIS*, Monticelli.

No specimens of this Bat were met with, nor in fact any representatives of the great genera *Vesperugo* or *Vespertilio*, in both of which the whole Arabian region seems to be singularly poor.

9. *COLEURA AFRA* (Peters).

*a, b.* Cave in island Ras Fakoum Bay (Little Aden). 6. IV. 95.

*c-j.* Cave at Aden. 13. IV. 95.

A few of these Bats were found in the first of these localities—a lofty cave with direct communication with the sea, and with deep water everywhere. Although a great number of *Tricenops persicus* and *Hipposiderus tridens* were also found in the same cave, this

<sup>1</sup> Compare J. A. Allen, Bull. Am. Mus. N. H. vi. p. 248 (1892), where a parallel variation in *Chilonycteris davyi* is shown to be "independent of sex, age, or season."

Bat kept itself entirely separate from them. The second locality was also a cave near sea-level, but, although communicating with the sea, its general level was above high-water mark; here *C. afra* was in considerable numbers, and was apparently the only species present. Each gravid female had, as usual, only a single fœtus.

10. *TAPHOZOUS PERFORATUS*, Geoffr.

a. Lahej. 22. III. 95.

b. ♀. Lahej. 29. III. 95.

These two specimens were obtained in the same cave as *Xantharpyia ægyptiaca*. Only these two species were seen in this cave, or, rather, tunnel, where a stream from the cultivated lands above to the bed of the Wady below had first cut and then burrowed its way underground.

Specimen *b* contained a single fœtus.

11. *RHINOPOMA MICROPHYLLUM*, Geoffr.

a. ♀? Aden. 9. IV. 95. In small cave alone.

This was the only specimen met with, although four or five Bats had been reported to have been seen in the cave (up among the rocks) a day or two previous.

12. *CROCIDURA RUSSULA* (Herm.).

a. Aden. 1885.

This Shrew, collected and presented to the Museum by Yerbury in 1885, was examined and identified as "*Crocidura aranea*" by Dr. Dobson—an identification which we provisionally accept, although not without some doubts on the subject.

We apply to this species the name *russula* instead of *aranea*, for the reasons set forth by Thomas in the 'Zoologist' for 1895<sup>1</sup>.

13. *CROCIDURA (PACHYURA) ETRUSCA*, Savi.

a. Aden. 1884.

b. Lahej. 17. III. 95.

This determination, like the last, is that of Dr. Dobson, in whose writing the 1884 specimen is labelled.

14. *ERINACEUS*, sp. inc.

A Hedgehog is sometimes to be seen for sale in Aden, but the inhabitants of the neighbourhood of Lahej do not seem to know the animal; it appears probable, therefore, that these specimens have been brought either from the Somali coast or from the neighbourhood of Makullah to the N.E. of Aden.

15. *FELIS MANICULATA*, Rüpp.

a. ♂. Domesticated. Aden. 18. II. 95.

b. Neighbourhood of Daraimia, shot by Mr. C. Chevallier, Eastern Telegraph Co.

<sup>1</sup> P. 62.



This is probably the Cat occasionally seen near the edge of the desert. When Yerbury was shooting Sand-Grouse in the neighbourhood of Shulaif, in company with Mr. Chevallier, the latter said that he had fired at a large Cat, but had not bagged it.

16. FELIS CARACAL, Güld.

Two specimens of this Lynx are known to be have been obtained in the neighbourhood of Aden: one is in the possession of Mr. Chevallier, and was shot by him near Haithalhim in the year 1884 or 1885; the other was obtained later on by another *employé* of the Telegraph Company, but exactly when and where was not recorded.

17. HERPESTES, sp. inc. (probably *H. albicauda*, Cuv.).

A Mongoose was seen at Haithalhim. The white-tailed species has been recorded by Thomas from Muscat, and no doubt occurs at Aden.

18. HYÆNA HYÆNA, Linn.

A Striped Hyæna was brought into Aden from the neighbourhood of Bir Ahmed, and was seen by Mr. C. Chevallier. Hyænas are reported to have been seen in the neighbourhood of Camp Aden; but this is the only authenticated record of its existence that is forthcoming.

19. CANIS AUREUS, Linn. (or *anthus*, Geoffr.).

A Jackal is without doubt to be found in the neighbourhood: one was seen near the Municipal bungalow at Shaik Othman, and another in Aden itself near the Isthmus position.

20. VULPES NILOTICA, Geoffr. (?)

a, b. ♂ ♀. Shaik Othman. 5. IV. 95.

The form obtained appears to be the common one in Aden itself and round the isthmus, that seen in the desert being altogether a brighter coloured animal.

In the present somewhat chaotic state of our knowledge of Foxes we do not venture to assign these specimens positively to *V. nilotica* or any other species; but there seems to be so little difference between them and Egyptian examples, that we propose to use this name for the present. We may note that some at least of the specimens from Muscat, determined by Thomas<sup>1</sup> as *V. leucopus*, Bly., are really the same as the present comparatively large animal; while others, again, agree very closely with Rajputana examples of Blyth's species, as Blanford has pointed out<sup>2</sup>.

Yerbury saw at Daraimia an individual of what he believed to be a second species of Fox, but was unable to procure a specimen. Perhaps this will prove to be the true *V. leucopus*.

<sup>1</sup> P. Z. S. 1894, p. 450.

<sup>2</sup> Mam. Brit. Ind. p. 152 (1888).

## 21. GERBILLUS (DIPODILLUS) PECILOPS, sp. n.

*α-c.* Lahej. 20-29. III. 95.*δ-g.* Shaik Othman. 2-3. IV. 95.

Size medium among Gerbilles in general; trunk larger than in *G. campestris*; but ears, feet, and tail shorter, the feet especially bearing to the size of the head and body the proportion found in *Mus* rather than *Gerbillus*. Fur short, soft, and sleek. General colour rich fawn, rather greyer on the back, brighter on the sides. Face with the usual supraorbital and post-auricular white patches very prominent; white of the lips and chin ascending on the cheeks nearly to the lower eyelid. On the top of the nose a distinct black patch. Ears very small and narrow, laid forwards in a spirit-specimen they only just reach to the posterior canthus of the eye; the anterior half of their outer surfaces thinly haired. fawn, the remainder naked; a large naked patch on the sides of the head behind and below their outer bases. Under surface, whole of fore limbs, front of hind limbs, and top of feet pure white. Palms as usual in the subgenus. Soles wholly naked, granulated distally, with six pads, as in typical *Dipodillus*, but the two proximal pads exceedingly small. Tail short, little, if at all, longer than the head and body; the hairs of its upper surface brown or black, not or scarcely elongated terminally, of its sides and lower surface white.

Skull strongly built, with heavy overhanging supraorbital ridges, somewhat like those of many *Meriones*, and forming rudimentary postorbital processes. Bullæ rather large, about as in average specimens of "*Hendecapleura*." Molars small and delicate.

Dimensions of an adult male, preserved in spirit:—

Head and body 107 millim.; tail 109; hind foot 23·5; ear 11 × 7·7.

Skull (of the type): basal length 26·2; greatest length in middle line 30·5; zygomatic breadth (c.) 17·2; nasals 11·5 × 3·4; inter-orbital breadth 5·9; tip to tip of postorbital processes 10·3; interparietal 3·3 × 6·8; palate length from hensenion 14; diastema 8·5; palatal foramina 4·5; upper molar series 3·6; greatest oblique diameter of bullæ 11.

*Type.* Skin *c.* B. M. No. 95.6.1.64.

This species differs so widely from all others known to us that we are unable to say what is its nearest ally. Its unusual proportions, its short ears, feet, and tail, compared with its heavy head and body, render it quite unlike the ordinary graceful Gerbilles. It will be seen from the measurements that the hind foot is actually shorter than the basal length of the skull, while in all other Gerbilles known to us it is longer.

With regard to its subgenus, we think that the characters of this and the next species render the distinction of *Hendecapleura* from *Dipodillus* exceedingly doubtful, as both present, with six posterior pads, the larger bullæ characteristic of *Hendecapleura*. While doubtful about this point, however, we should like to say a word of appreciation of Lataste's remarkable, and, we believe,

thoroughly sound, revision of the group, in which he evolved something like order out of chaos.

This pretty species seemed to be common, both at Lahej and Shaik Othman.

22. GERBILLUS (DIPODILLUS) LIXA, sp. n.

*a.* Skin. Shaik Othman. 24. II. 95.

*b, c.* Skins; *d.* In spirit. Lahej. 26-29. III. 95.

Size, proportions of trunk and tail, and general colour and appearance very much as in *Mus bactrianus*; that is to say, the pallid desert form of *Mus musculus*. Colour above greyish fawn, the slaty basis to the hairs showing through. Face-markings as in *G. pœcilops*, although much less prominent; supraorbital and postauricular white, and dark nasal spots present. Ears small, laid forwards in a spirit-specimen they just reach to the posterior canthus of the eye. Under surface and fore and hind limbs pure white throughout; hind feet very thick and lumpy; palms and soles as in *G. pœcilops*—*i. e.*, naked with five anterior and six posterior pads, the proximal plantar ones very small. Tail short, scarcely longer than the head and body, brown above, white below, its terminal inch very inconspicuously tufted.

Skull, compared with that of *G. nanus* or *G. simoni*, broader and heavier, with a much broader muzzle. Bullæ larger than in *G. simoni*, smaller than in *G. nanus*. Laminae of molars directly transverse.

Dimensions of the type, a slightly immature female, measured in the flesh by collector:—

Head and body 65 millim.; tail 75; ear 8.5.

Skull: basal length  $19.2 \times 24$ ; zygomatic breadth  $13.7 \times 8.4$ ; nasals  $2.4 \times 4.7$ ; interparietal  $3.1 \times 6.6$ ; diastema  $6.5 \times 3.5$ ; greatest diameter of bulla 8.9.

An adult male in spirit measures: head and body 70; tail 74; hind foot 21; ear  $9 \times 6.5$ .

*Type.* Skin *a.* B. M. No. 95.6.1.67.

This little Gerbille most nearly resembles *G. nanus*, Blanf., and its allies, but differs from any of them by its heavy lumpy feet and short and little crested tail. *G. botte*, Lat., of the distinction of which from *G. nanus* we are at present unable to satisfy ourselves, was founded on a specimen with a mutilated tail; but Sundevall's "*Gerbillus gerbillus*, Oliv.," likewise from Sennaar, had a tail 115 millim. long, and probably represents Lataste's species, although the latter author assigns it to his *G. quadrimaculatus*. The last-named and *G. dasyurus*, Wagn., are both long-tailed forms. One short-tailed Gerbille, *G. simoni*, Lat., has been described from Algeria; but, as is shown by a co-type in the British Museum, it differs from *G. lixa* by its much brighter coloration, its even shorter tail, and its smaller bullæ.

Specimens *b, c,* and *d* were caught in the cook-house of the bungalow at Lahej, and were brought to Yerbury as "mice," the habits as well as colour of which they therefore seem to imitate.

It was said to be not unusual for this animal to occur in the houses of the natives.

Specimen *a* was dug out of the sand.

23. GERBILLUS ("HENDECAPLEURA") FAMULUS, sp. n.

*a*. ♀. Lahej. 10. III. 95.

Size about as in *G. campestris*. General colour, so far as can be seen in an imperfect spirit-specimen, similar to other small fawn-coloured Gerbilles, the usual whitish marks on cheeks, in front of and behind eyes, and at bases of ears apparently present; middle line of face, however, greyer, especially on the nose. Ears large, the anterior half of their outer surface thinly clothed with blackish hairs. Whole of under surface and backs of hands and feet pure white. Palms with two carpal pads as usual. Soles wholly naked, granulated distally, with four small pads only. Tail of type imperfect, but on the three inches of it present the hairs above are white with black tips, below wholly white.

Skull long and narrow, in size and general form not unlike, though larger than, that of *G. gerbillus*, widely separated as the two species really are. Muzzle remarkably long and slender, the nasals overhanging the incisors anteriorly to a quite unusual extent. Supraorbital edges well-rimmed, the rims thickened. Interparietal broad transversely, short antero-posteriorly. Bullæ rather large, approaching those of *G. gerbillus*, far larger than those of *G. campestris*; front wall of meatus slightly swollen. Inner cusp of middle lamina of *m.*<sup>1</sup> slightly anterior to outer cusp.

Dimensions of the type, an adult female skin, preserved in spirit<sup>1</sup>:—Head and body (c.) 90 millim.; tail imperfect, 70 × . . .; hind foot 27·7; ear 16 × 10.

Skull: basal length 25·8; extreme length in middle line 31·4; greatest breadth 16; nasals 12·7 × 3·2; interorbital breadth 5·8, interparietal 3·4 × 8; palate length from hensenion 13; diastema 7·9; palatal foramina 5; length of upper molar series 4·1; greatest oblique diameter of bullæ 11·2.

*Type*. B. M. No. 94.6.1.28.

This pretty little Gerbille is a typical member of the group to which Lataste applied the name of *Hendecapleura*, a group from which *Gerbillus* (*sens. strictiss.*) differs in its hairy feet and single carpal pad, and *Dipodillus* in its six plantar pads and smaller bullæ, although, as already noted, the latter seems to be connected with it by intermediate species.

The nearest ally of *G. famulus* is perhaps the Algerian *G. (H.) garamantis*, Lat., from which it differs by its decidedly greater size. *G. dasyurus*, *botte*, *quadrimalaculatus*, and *nanus* are also all much smaller, while *G. persicus*, Blanf., which has the same foot-structure, is enormously larger.

The single specimen of this Gerbille was trapped at the mouth of the burrow of *Meriones rex*.

<sup>1</sup> The specimen was intended for a skin, but the hairs commencing to fall it was put into spirit, never having been allowed to dry. The ear and feet measurements are therefore exact, while that of the body is merely approximate,

24. *MERIONES REX*, sp. n.

*a-g.* Seven specimens, ♂ ♀. Lahej. 6-10. III. 95.

Most closely allied to *M. shawi*, Duv. & Ler., which ranges from Algeria through Tunis and Egypt as far as the Sinaitic Peninsula. Size larger, form stouter and heavier. Fur short, poor and rather harsh, very different to the beautiful fur of *M. shawi*. General colour dirty fulvous brown above, and this colour, at least in the old specimens, extends all over the underside as well; in younger specimens, however, the underside is whitish as usual. Ears much as in *M. shawi*, but rather more thinly haired, and the whitish spot behind their outer bases less sharply defined. Hands as in *M. shawi*, the usual two large wrist-pads present. Feet very large and heavy; upper surface of metatarsals with a slight but distinct blackish suffusion; digits dull whitish; soles almost or wholly naked, the few minute hairs not hiding in any way the usual *Meriones*-structure of the skin and pads. Tail long, thick, cylindrical, uniform grizzled fawn above and below throughout, except that the hairs on the top of the terminal two inches are lengthened to form a crest, which varies in colour from black to brown.

Skull-differences are in this genus very difficult of description, owing to the great variation that takes place with age, so that it is always difficult to find specimens which may be properly compared with each other, without disturbance by the factor of age. However, among 16 skulls in the Museum collection referred with more or less certainty to *M. shawi*, there are none so large as that of the type of *M. rex*, none have such long and narrow interparietals, or have their auditory meatus so little swollen anteriorly. The bullæ are, if anything, slightly smaller in the new form than in *M. shawi*, and show therefore no approach to the huge bullæ of the *erythrurus* group.

Dimensions of the type, an old male in spirit:—

Head and body 183 millim.; tail 200; hind foot 41·5; ear 19·5.

Skull: basal length 41·2; greatest length in middle line 48; greatest breadth 27·5; nasals 19·6 × 5; interorbital breadth 8·5; tip to tip of postorbital processes 16; interparietal 5·6 × 8·7; palate, length from hensenion 21·7; diastema 12·6; anterior palatine foramina 8·6; distance from hinder angle of zygoma to nearest point of wall of meatus 2·1.

*Type.* In spirit. B. M. No. 94.6.1.30.

This fine species, nearly or quite the largest of the genus, differs from every known *Meriones* in its practically naked soles, its dirty-coloured belly, and its darkened metatarsi. The only species for which it could be mistaken is *M. shawi*, but, besides the differences just mentioned, it is larger than that animal, and has a decidedly longer tail.

Of other Arabian species known, it may be mentioned that *M. crassus*, Sund., from Sinai, quite clearly belongs to the *erythrurus* group, with large bullæ, while *M. melanurus*, Rüpp., as

shown by two co-types in the Museum collection, is simply the eastern representative of the Algerian *M. shawi*.

The large burrows found among the bushes of *Salvadora persica* on the borderland between the desert and the cultivated ground appear to be the work of this species, although several other animals also inhabit them. Thus at the mouth of one burrow there were obtained examples of *M. rex*, *Gerbillus famulus*, *Acomys dimidiatus*, and a Lizard.

*M. rex* appears to be on the move in the early hours of the morning until about 8 A.M., and the specimens brought home were with one exception shot at the mouths of the burrows. Owing, apparently, to these animals feeding on the green shoots of the *Salvadora*, which fermented and distended the stomachs, it was exceedingly difficult to get the specimens back to camp in fit condition for skinning, so rapidly did they spoil.

## 25. ARVICANTHIS<sup>1</sup> VARIEGATUS, Licht.

*a-f.* Skins; *g-n.* In spirit. Lahej. III. 95.

This is the common Field-Rat of the neighbourhood of Lahej, and is to be found plentifully in the ditches separating the fields—in fact anywhere where the tall rank grass grows; it does not appear to venture into the desert, nor into the rank high reeds which cover the river-bed between Haithalhim and Zaidah.

The present is, so far as we are aware, the first recorded instance of the occurrence of this genus, hitherto known as "*Isomys*," off African soil. Although with slightly larger feet and tails than in examples from Egypt, these specimens do not appear to be specifically separable from the common form.

## 26. MUS DECUMANUS, Pallas.

*a.* Aden. II. 95.

Probably common, but no doubt introduced by sea.

## 27. MUS RATTUS TYPICUS, L.

*a.* ♀. One specimen. Aden. 19. IV. 95.

No doubt also introduced from some European ship. The marked difference between this and the indigenous *M. r. alexandrinus* is noteworthy.

## 28. MUS RATTUS ALEXANDRINUS.

*a-r.* Aden, Shaik Othman and Lahej. 17 specimens.

Very common and generally distributed; appears to be the common Rat of the neighbourhood. All the specimens are grey above and none have the reddish coloration of *M. r. rufescens*, Gr.

<sup>1</sup> Less. N. Tabl. R. A. p. 147 (1842). Type "*Lemmus niloticus*, Geoffr." (= *A. variegatus*). Syn. *Isomys*, Sund. K. Vet.-Ak. Handl. 1842, p. 219 (1843). Type "*Mus variegatus*." Thomas's attention was drawn to this unfortunate but necessary change by Mr. T. S. Palmer, of the U.S. Department of Agriculture, who has been devoting much labour to the subject of Mammal nomenclature.

29. *MUS BACTRIANUS*, Blyth.

a. ♀? Lahej. 13. III. 95.

A pair were found nesting in a tree in the Sultan's garden at Lahej on the above date: the female was secured, but the male escaped. This was the only occasion on which the species was met with. The nest was in a hollow tree and was made of fine twigs and leaves of the Behr tree (*Zizyphus*, sp.).

This is the ordinary oriental representative of *Mus musculus*, of which it no doubt merely constitutes a subspecies. The typical *M. musculus* probably occurs in Aden itself, introduced from the shipping. Indeed "mice" were said to be common in the Hôtel d'Europe, although Yerbury failed to capture any of them.

30. *ACOMYS DIMIDIATUS*, Rüpp.

a. ♂. Aden. 21. II. 95.

b. ♀. Aden. 24. II. 95.

c. Lahej. 10. III. 95.

d. ♂. Lahej. 13. III. 95.

e. Haithalhim. 25. III. 95.

The first two specimens are clearly *A. dimidiatus*, but the last three are more doubtful, and will need re-examination when further material is available.

Probably common. The Aden specimens were trapped round the house; the others at the earths of *Meriones rex*.

31. *HYSTRIX LEUCURA*, Sykes.

a. ♂. Haithalhim. 23. III. 95.

The capture of this specimen is of much interest, as it was quite unknown what species of Porcupine occurred at Aden. The skull proves to be very similar to that of Indian examples of *H. leucura*, and wholly different to the inflated skulls of the African Porcupines *H. cristata*, *H. galeata*, and *H. africe australis*. This resemblance to *H. leucura* confirms the reference of *H. hirsutirostris*, Wagn., which was based on a Palestine specimen, to the Indian species.

Dr. Matschie was perhaps rather venturesome in referring the Aden Porcupine to the South-African species, as he only had spines for examination, and these vary so much in different parts of the body as to be exceedingly difficult to make much of when loose and of uncertain origin.

Porcupines are very common (judging from the number of tracks) round Lahej and Haithalhim, but being nocturnal are seldom, if ever, seen. They are also very shy and cautious animals and will not, as a rule, enter a trap, therefore the way the above specimen was circumvented may be of interest. On arrival at Haithalhim tracks of Porcupines were found in every direction, and an attempt was made to shoot one by watching during the night, but without success; it was noticed, however, that the animals followed a path leading up from the bed of the Wady Kubeen to the cultivated grounds above, and an examination of the path in the morning

showed a place where the path for a couple of yards or so had cut itself deep into the soft soil and formed a trench about 18 inches wide and two feet deep.

A Brailsford dog-trap was set in this trench, and a watch kept as before in the nullah. In the small hours of the morning Porcupines were to be heard about, making a sort of grunting noise, and it was decided to try and drive one of them up the path. This manœuvre was successful, and the sound of the doors falling told the hunters that the Porcupine had been more afraid of them than of the strange metal case in front, and in attempting to rush through had got caught.

32. *LEPUS ARABICUS*, Hempr. & Ehr.

*a, b.* Heads. Lahej. 7. III. 95.

*c.* ♂. Lahej. 17. III. 95.

These three specimens are probably conspecific, but whether or not two species exist at Aden is a moot point. Yerbury is inclined to believe that there are two Hares in the district, differing considerably in size. The smaller one may perhaps be Thomas's *L. omanensis*, described from Muscat.

33. *GAZELLA BENNETTI*, Sykes ?

*a.* Frontlet ♂, without date, &c.

We are somewhat doubtful about our reference of this Gazelle to *G. bennetti*, but not only does this frontlet correspond very closely with Indian examples, but a specimen from Aden, now alive at the Zoological Gardens, has been referred by Mr. Selater to the same species.

Gazelles are common inland round Aden, and possibly two or more species are to be met with in the neighbourhood.

34. *CAPRA SINAITICA*, Hempr. & Ehr.

An Ibex appears to be not uncommon in the mountains inland, though the British officers who have been there after them on shikar expeditions do not appear to have been very successful. Horns are occasionally to be bought in Aden.

35. *HALICORE DUGONG*, Ill.

Dugong are to be found at Little Aden. One was on view during March 1895 at Steamer Point, and another was thrown up on the beach in front of the European Infantry lines about the same time and caused the municipal authorities some trouble before the carcase was disposed of.

36. *BALÆNOPTERA*, sp.

The skull of a large Finner, perhaps *B. edeni*, is to be seen near the Eed Ghur, Camp Aden. The animal was said to have been cast ashore some 30 miles to the north-east, and the skull was brought to Aden because it was supposed that it might be useful for making knife-handles, &c.



4. A Monograph of the Bornean *Lycænidae*.  
By HAMILTON H. DRUCE, F.Z.S., F.E.S.

[Received June 14, 1895.]

(Plates XXXI.—XXXIV.)

Since my father, Mr. Herbert Druce, published, in the Proceedings of this Society for 1873, a list of Bornean butterflies obtained by Mr. (now Sir Hugh) Low in the neighbourhood of Labuan, very little has been written on the subject at all and scarcely any additions have been made to our knowledge of the *Lycænidae*. Messrs. Distant and Pryer have described a few, obtained at Sandakan by Mr. Pryer, in the 'Annals and Magazine of Natural History' (ser. 5) vol. xix. 1887, as also has Mr. Grose Smith in vol. iii. (ser. 6), 1889, of the same periodical; whilst Mr. de Nicéville has mentioned some species as occurring in Borneo in his work on the Butterflies of India, Burmah, and Ceylon, and has described one or two in the Journal of the Bombay Natural History Society, 1891. In the Journal of the Asiatic Society of Bengal, vol. lx. 1891, Mr. W. Doherty has recorded a few species, and described a new one of the genus *Nacaduba*, and Dr. Butler, in an account of a collection of Lepidoptera obtained by Mr. W. B. Pryer at Sandakan published in the Proceedings of this Society (P. Z. S. 1892, p. 121), has described a single species of the genus *Arhopala*. These papers, with the addition of one or two solitary descriptions, are all that I can discover as referring to the *Lycænidae* of the region dealt with here.

The large amount of material which I have worked upon for this paper is partly contained in Messrs. Godman and Salvin's collection, and my thanks are due to those gentlemen for kindly allowing me free use of their fine series, and also to Dr. Staudinger, to whom I am also much indebted for the opportunity of examining the whole of the specimens collected on Kina Balu by Waterstradt and at Labuan by Wahnes. This collection from Kina Balu, containing as it does examples of a large number of new species, I have found of the greatest importance; and to those interested in the geographical and other features of this great mountain I would recommend a perusal of Mr. J. Whitehead's book, 'The Exploration of Kina Balu, N. Borneo.' Besides these collections, we have in our own possession a considerable number of specimens from Kina Balu, Elopura, Sarawak, and Sandakan.

Dr. Staudinger informs me that the species labelled "Labuan," captured by Waterstradt and Wahnes, are not from the small island on the N.W. coast but from the mainland opposite.

Mr. Herbert Druce recorded 71 species of the family in his list, and this number I am now able to increase to about 220, inclusive of about a dozen species of the genus *Arhopala* which are either undetermined or unnamed. Mr. de Nicéville enumerates 402 species in 'The Butterflies of India etc.,' so that we have already



W.Parkiss lith.

West, Newman imp.

Bornean Lycaenidæ.

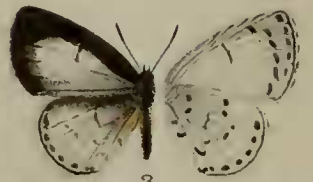




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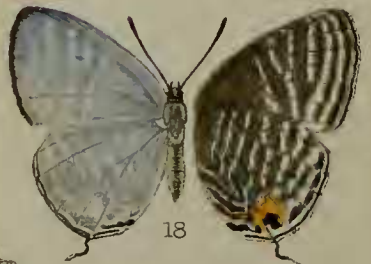
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21



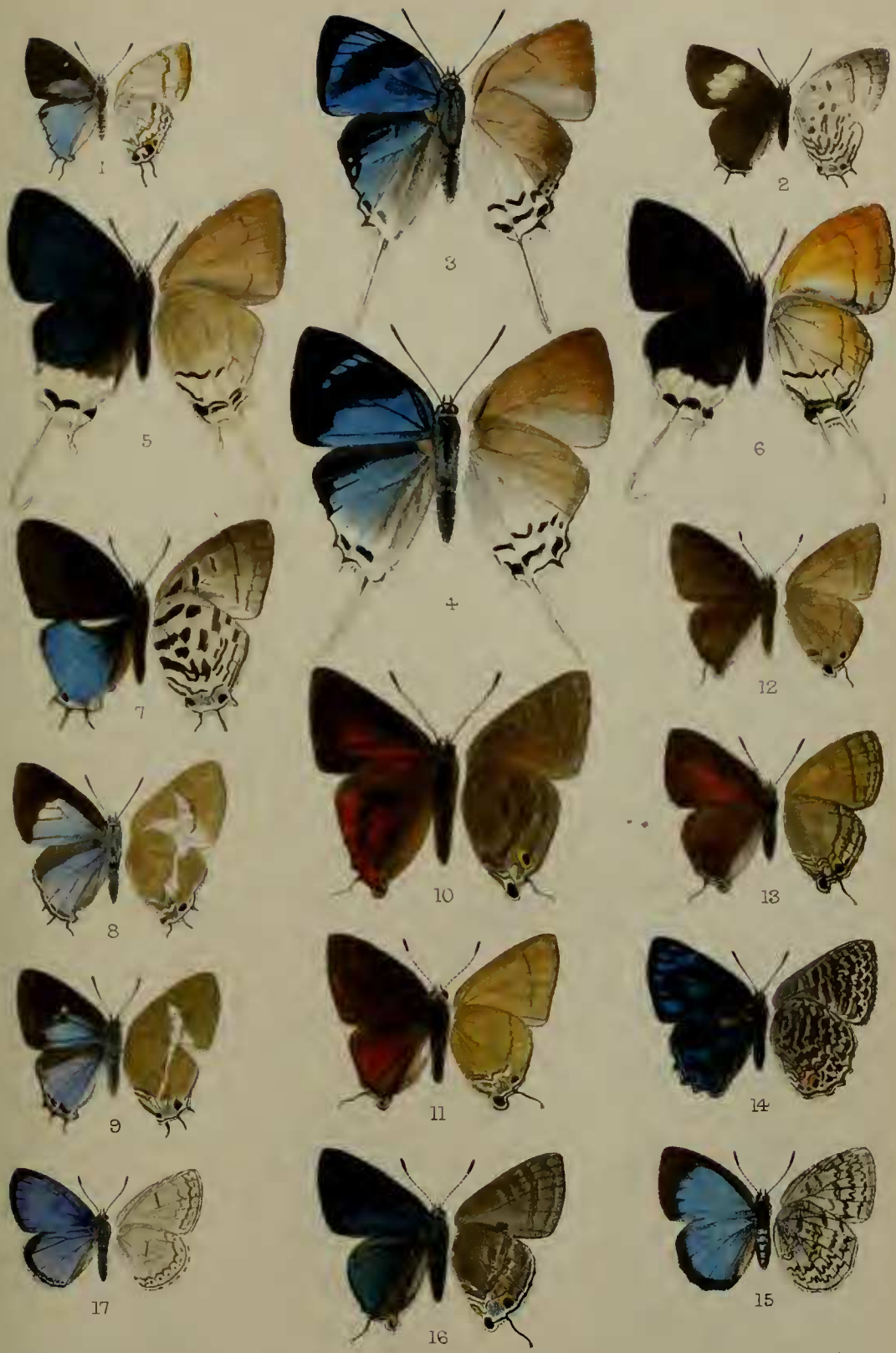


W Pockiss lith

West, Newman imp

Bornean Lycaenidae.





W Purkiss lith.

West, Newman imp.

Bornean Lycaenidæ.





from Borneo, in which island but two or three localities have been anything like worked, more than half as many species as have been found in the extensive region of which his book treats. In 'Rhopalocera Malayana' Mr. Distant has recorded 133 species of the family, so that with these facts one may conclude that the *Lycenidæ* are very well represented in Borneo. Mr. H. J. Elwes has expressed his opinion that when the higher mountain-ranges of Java, Sumatra, Borneo, &c. come to be explored there will be found to be a considerable resemblance between the butterflies inhabiting them and those of the Himalayas; and so far as the *Lycenidæ* are concerned I think a perusal of the following pages will confirm this.

Besides the number of types of Bornean species which are contained in Messrs. Godman and Salvin's collection, Dr. Staudinger has kindly sent me the whole of his types of Palawan species described in 'Iris,' vol. ii., which I have found very useful and in some cases absolutely necessary for correct identification.

The arrangement here followed is that of Mr. de Nicéville's admirable work, 'The Butterflies of India, Burnah, and Ceylon.'

The following is a list of the species noted in this paper—those marked with an \* being new species described from adjacent localities:—

- |  |  |
|--|--|
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| „ innocens, sp. n., p. 560.                          | „ pheretia, <i>Hew.</i> , p. 569.                |
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| „ philippus, <i>Staud.</i> , p. 561.                 | „ philura, sp. n., p. 569.                       |
| „ vincula, sp. n., p. 561.                           | Simiskina pharyge, <i>Hew.</i> , p. 569.         |
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| „ waterstradti, sp. n.,<br>p. 562.                   | Pithecopus hylax, <i>Fab.</i> , p. 570.          |
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| „ aphocha, <i>Kheil</i> , p. 563.                    | Cyaniris dilectissima, sp. n., p. 571.           |
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| „ unicolor, <i>Feld.</i> , p. 564.                   | „ *phuste, sp. n., p. 573.                       |
| Logania regina, <i>Druce</i> , p. 564.               | „ selma, sp. n., p. 573.                         |
| „ obscura, <i>Dist. &amp; Pryer</i> , p. 565.        | „ strophis, sp. n., p. 573.                      |
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| „ pbormedon, sp. n., p. 566.                         | Zizera otis, <i>Fab.</i> , p. 575.               |
| „ pellaonia, <i>Dist. &amp; Pryer</i> , p. 566.      | Lycænesthes emolus, <i>Godt.</i> , p. 575.       |
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p. 617.	„ pheretima, <i>Hew.</i> , p. 623.
Eooxylides tharis, <i>Hüb.</i> , p. 618.	„ xenophon, <i>Fab.</i> , p. 623.
„ etias, <i>Dist. &amp; Pryer</i> , p. 618.	„ barthema, <i>Dist.</i> , p. 623.
Loxura atymnus, <i>Cr.</i> , p. 618.	„ laima, sp. n., p. 624.
Drina ninoda, sp. n., p. 619.	„ dramos, sp. n., p. 624.
„ maneia, <i>Hew.</i> , p. 619.	„ domitia, <i>Hew.</i> , p. 624.
Araotes lapithis, <i>Moore</i> , p. 619.	Bindahara phocas, <i>Staud.</i> , p. 625.
Sithon micea, <i>Hew.</i> , p. 620.	Sinthusa nasaka, <i>Horsf.</i> , p. 625.
„ nedymond, <i>Cr.</i> , p. 620.	„ amba, <i>Kirby</i> , 625.
Deudorix epijarbas, <i>Moore</i> , p. 620.	„ amata, <i>Dist.</i> , p. 625.
„ staudingeri, sp. n., p. 621.	Liphyra brassclis, <i>Westw.</i> , p. 626.

## GERYDUS, Boisd.

GERYDUS GIGAS, sp. n. (Plate XXXI. fig. 3 ♂.)

*Miletus gigas*, *Staud.* MS.

♂ ♀. Allied to *G. gigantes*, de Nicév., in size and form, but differing from that species by the basal area of the fore wing being greyish black, extending to the median nervules, and in the female reaching nearly across the white area to the apical black margin, and by the hind wings being uniform greyish black. The underside differs from *G. gigantes* by the male only possessing rather larger white patches on the fore wing.

Kina Balu (*Waterstr.*). Type Mus. *Staud.*, Mus. *Druce*.

This fine species can be at once distinguished from *G. gigantes* from N.E. Sumatra by the black basal area of the fore wing and by the black hind wings. The male of *G. gigantes* has “a small portion of the base of the third median nervule prominently swollen;” in *G. gigas* this swollen portion is nearly  $\frac{1}{3}$  inch long.

This is allied to *G. ancon*, Doherty, but the description, however, does not quite fit it, notably as regards the “marginal dark line” on the underside, which is absent in *G. gigas*. The figure given by Mr. Doherty of the male is much like *gigas* ♀.

## GERYDUS SYMETHUS.

*Papilio symethus*, *Cr. Pap. Ex. ii. pl. cxlix. figs. B, C (1777).*

Labuan (*Wahnes and Low*); Sandakan (*Pryer*).

The female from Sandakan has the white on the hind wing reduced to a discal streak and is very pale on the underside, but the markings appear to be the same as in the typical form.

## GERYDUS PETRONIUS.

*Gerydus petronius*, *Distant & Pryer*, *Ann. Mag. Nat. Hist ser. 5, xix. p. 266 (1887).*

Elapura.

I have not seen this species, the female only of which is described. We possess specimens from Nias I. which are referred to *G. symethus*, but which possibly are *G. petronius* if this should prove to be a distinct species.

GERYDUS INNOCENS, sp. n. (Plate XXXI. fig. 4 ♂.)

*Miletus innocens*, Staud. MS.

♂. Upperside: fore wing white, the apical half and outer margin to anal angle black, greyish along the costa to about the middle of the cell: hind wing white, slightly tinged with greyish; costal margin broadly black; anal and outer margins narrowly dusted with blackish brown, darkest at the tips of the nervules. Underside: ground-colour pale grey, with dark chocolate markings and spots arranged much as in *G. symethus*, but the short band near the apex of the fore wing straighter and broader and the basal streak below the cell ending abruptly where it meets the white, just beyond the base of the lower median nervule, not running along the nervules as in *G. symethus*.

♀. Upperside differs only from male by the white area of the fore wing being slightly more extensive, by the purer white of the hind wing, which has the outer margin dentated rather more strongly than *G. symethus* ♂, the cilia only being fuscous. Underside as male, but with the white discal area slightly larger.

Expanse, ♂  $1\frac{4}{5}$ , ♀  $1\frac{1}{2}$  inch.

Kina Balu (*Waterstr.*). Types Mus. Staud.

*G. innocens* is much like *G. gigantes* on the upperside, but is very different below, and the dentated outer margin of the hind wing of the female also distinguishes it. The swollen base to the third median of the fore wing in the male, which is present, so far as I know, in all other species of the genus, is entirely wanting, in *G. innocens*. The coloration of the underside is quite different from *G. symethus*. Dr. Staudinger has sent me a pair of this interesting butterfly.

GERYDUS BIGGSII.

*Gerydus biggsii*, Distant, Rhop. Malay. p. 206, pl. xxii. fig. 12, ♀ (1884).

*Gerydus gopara*, de Nicév. Butt. India etc. iii. p. 25 (1890).

Kina Balu (*Waterstr.*); Sandakan (*Pryer*); Labuan (*Low* and *Wahnes*).

This is a somewhat puzzling species, as it appears to vary considerably in the width of the white band on the fore wing: in males from Sandakan and Kina Balu it is shortest and narrowest, and in one specimen in Messrs. Godman and Salvin's collection is practically reduced to a median patch, being almost all below the third median nervule; in a male from Labuan in Dr. Staudinger's collection it is broad and long and the basal area is much paler than usual. The females before me from Kina Balu are much like the male noted above from Labuan and present a very different appearance from Mr. Distant's figure.

## GERYDUS PHILIPPUS.

*Miletus philippus*, Staud. Lep. Palaw. p. 92, pl. i. fig. 2 (1839).

*Gerydus irroratus*<sup>1</sup>, Semper (nec Druce), Schmett. Phil. Insel. p. 162, pl. xxxi. figs. 10, 11, 12 (1889).

Labuan (*Low and Wahnes*).

Both sexes of this species from Borneo agree exactly with Herr Semper's figures. Dr. Staudinger has kindly sent me his types for examination, and I quite agree with Herr Semper (*vide* Supp. Schmett. Phil. Insel.) that they are conspecific; but as *irroratus*, Druce, falls before *boisduvali*, Moore, Dr. Staudinger's name must stand.

Dr. Staudinger possesses a female from S.E. Borneo, near Banjarmasin, taken by Wahnes, which may possibly represent another species, as the band on the upperside is very narrow and obscured and the underside is of a reddish-brown hue; but without seeing a male I do not care to describe it.

The specimen referred to *M. zinkenii*, Feld., by Mr. Herbert Druce (P. Z. S. 1873, p. 348), is an example of *G. philippus*.

GERYDUS VINCULA, sp. n. (Plate XXXI. figs. 9 ♂, 10 ♀).

♂. Upperside uniform dull brown, with a pale oval spot at the base of the third median nervule of the fore wing, which just surrounds the swollen portion of the vein. Underside much like that of *G. philippus* but paler, and with a submarginal band of confluent markings extending from the apex to the outer angle of the fore wing and with the marginal spots very indistinct.

♀. Form of *G. philippus*: upperside uniform dull brown without markings; underside as male.

Expanse, ♂  $1\frac{3}{10}$ , ♀  $1\frac{1}{10}$  inch.

Borneo.

This obscure species is, I believe, the only one of the genus which has the ultra-median band on the underside of the fore wing extending across the wing to the anal angle—it usually ends somewhere about the third median nervule; the sombre colouring of the female is also unusual. The types are in Messrs. Godman and Salvin's collection, the male received from Dr. Staudinger and the female formerly in Bates's cabinet, neither being exactly localized<sup>2</sup>.

## PARAGERYDUS, Distant.

## PARAGERYDUS HORSFIELDI.

*Miletus horsfieldi*, Moore, Horsf. & Moore, Cat. Lep. Mus.

<sup>1</sup> I have carefully examined the type of Mr. Herbert Druce's *Miletus irroratus*, which is in Messrs. Godman and Salvin's collection, and find that it is quite impossible to separate it from *G. boisduvali*, Moore.

<sup>2</sup> I have not included the *Megalopalpus simplex*, described by Herr Röber ('Iris,' i. p. 51, pl. iv. f. 1. 1885) from Borneo, as I am of opinion that it is an African species closely allied to, or identical with, the *Pentila zymna*, Doub., Hew. I have not seen *M. simplex*, and judge from the figure only, which is from a photograph.

E. I. C. vol. i. p. 19, pl. 1 a. fig. 2 (1857); Druce, P. Z. S. 1873, p. 347.

Kina Balu (*Waterstr.*); Labuan (*Waterstr.* and *Low*); Elopura (*Pryer*); S.E. Borneo (*Wahnes*).

Mr. Pryer took the species in March.

PARAGERYDUS WATERSTRADTI, sp. n. (Plate XXXI. figs. 1 ♂, 2 ♀.)

♂. Upperside allied to *P. horsfieldi*, Moore; same shade of brown, but with the discal patch more elongated and less distinct. Underside pale brown, with darker markings and spots and a marginal row of black spots inwardly bordering white dots.

♀. Upperside uniform dull brown, not paler discally in the fore wing; underside as male, but ground-colour rather paler.

Ab. ABSENS, nov.

♀. Upperside as typical female; underside pale brownish cream-colour, with the larger brown markings only present, the wavy lines being entirely wanting.

Expanse, ♂  $1\frac{7}{10}$ — $1\frac{1}{2}$ , ♀  $1\frac{3}{5}$ — $1\frac{1}{2}$  inch.

Kina Balu (*Waterstr.*). Mus. Staud. and Druce.

*P. waterstradti* differs from *P. horsfieldi* by the more elongate discal band and by the underside being usually darker. It is also a smaller insect, noticeable especially in the males. The variety described above presents a very curious appearance.

PARAGERYDUS PYXUS.

*Paragerydus pyxus*, de Nicév. J. A. S. B. vol. xliii. pt. 2, no. 1, p. 27, pl. v. fig. 2, ♂ (1894).

Borneo.

Described as rufous brown on the upperside.

PARAGERYDUS MOOREI, sp. n. (Plate XXXI. figs. 5 ♂, 6 ♀.)

*Miletus moorei*, Staud. MS.

♂. Upperside dull brown, colour of *P. waterstradti*, but with the discal patch paler, more conspicuous, and about half as long as in that species. Underside pure white, with spots and striæ much as in that species and *P. horsfieldi*, but with the marginal row of spots placed further from the margin in both wings.

♀. Upperside uniform dull brown, with disc of fore wing slightly paler. Underside as in male.

Expanse, ♂  $1\frac{7}{10}$ , ♀  $1\frac{1}{2}$  inch. Mus. Staud.

Kina Balu (*Waterstr.*).

This species should be distinguished from its allies by the pure white ground of its underside and by the short discal spot on the male above.

The male appears to agree exactly with Mr. de Nicéville's figure of *P. horsfieldi* (Butt. Ind. iii. pl. xxvi. fig. 156), which I believe is not the true *P. horsfieldi*, Moore, as the discal band is considerably shorter. *P. horsfieldi* occurs in Java, Sumatra, Borneo, and Malacca.

## PARAGERYDUS TARAS.

*Paragerydus taras*, Doherty, J. A. S. B. vol. lviii. pt. 2, p. 437, t. xxiii. fig. 10 (1889).

S.E. Borneo (north of Banjarmasin) (*Wahnes*).

I have received a specimen which agrees well with Mr. Doherty's description and figure, excepting that it has a faint indication of a pale spot on the disc of the fore wing above.

## PARAGERYDUS CAUDATUS. (Plate XXXI. figs. 7 ♂, 8 ♀.)

*Allotinus caudatus*, Grose Smith, Ann. Mag. Nat. Hist. ser. 5, vol. xii. p. 34 (1893).

♂. Upperside dull brown; the discal streak on the fore wing elongated and inconspicuous, much like *P. waterstradti*, which it closely resembles on the upperside in coloration and shape of both wings. Underside as female, but ground-colour tinged with brown and rather more heavily marked.

Expanse, ♂  $1\frac{7}{10}$ , ♀  $1\frac{2}{5}$  inch.

Kina Balu (*Waterstr.*).

I have compared the female with Mr. Grose Smith's type and find them identical; it is remarkable for the shape of the hind wing, the third median nervule being produced so as to form a blunt tail, and in this respect differs from all others in the genus. In neuration it appears to be a typical *Paragerydus*.

## PARAGERYDUS FABIUS.

*Paragerydus fabius*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 266, ♀ (1887).

Sandakan (*Pryer*).

This species is known to me only by the description; quite possibly it is the same as the preceding (*P. caudatus*), but Mr. Distant does not describe a projecting third median nervule in the hind wing, which is such a distinctive character in that species.

## PARAGERYDUS APHOCHA.

*Allotinus aphocha*, Kheil, Rhop. Ins. Nias, p. 28, pl. v. fig. 30 (1884).

Labuan (*Wahnes*).

One specimen, a male, which is identical with several males from Nias Islands.

The outer margin of the hind wing is always strongly dentate. It appears to differ from *P. horsfieldi* by its much smaller size and by the pale ground-colour below, and by the comparatively small discal spot above.

## ALLOTINUS, Feld.

## ALLOTINUS SUBVIOLACEUS.

*Allotinus subviolaceus*, Feld. Reise Nov., Lep. ii. p. 286, t. 35. figs. 27, 28 (1865).

Kina Balu (*Waterstr.*).



The male agrees well with Felder's figure. The differences which separate *A. alkamah*, Distant, from this species, appear to be exceedingly slight; indeed males before me from Malacca and Kina Balu are identical, whilst one Bornean female has nearly the whole of the hind wing dusted with bluish scales. Mr. de Nicéville records *A. alkamah* from Borneo (Butt. Ind. iii. p. 30).

ALLOTINUS AUDAX, sp. n. (Plate XXXI. figs. 11 ♂, 12 ♀.)

*Miletus audax*, Staud. MS.

♂. Upperside allied to *A. subviolaceus*, Feld., but with the blue discal band replaced by a narrower creamy-white band; hind wing blackish brown, slightly paler on the disc. Underside much as in *A. subviolaceus*, but the ground paler and the spots and striæ standing out more distinctly.

♀. Upperside as *A. subviolaceus* ♀, but the blue areas replaced by clear creamy white; underside as male, but spots and striæ rather paler.

Kina Balu (*Waterstr.*). Mus. Staud. and Druce.

ALLOTINUS NIVALIS.

*Miletus nivalis*, Druce, P. Z. S. 1873, p. 348.

Sandakan (*Pryer*); Kina Balu (*Waterstr.*); Labuan (*Low*); S.E. Borneo (*Doherty*).

The *L.* (= *A.*) *substrigosa*, Moore, may be a distinct species, as the type and all other specimens I have examined from Borneo have the black spot on the costa of the hind wing below replaced by a pale brown one; this, however, is the only difference I can detect between these specimens and three in our collection from the Tenasserim Valley (*Doherty*), in all of which the black spot is very distinct.

ALLOTINUS UNICOLOR.

*Allotinus unicolor*, Feld. Reise Nov., Lep. ii. p. 286 (1865); Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 266 (1887).

Sandakan (*Pryer*).

*A. unicolor* is included here on the authority of Messrs. Distant and Pryer. I do not know the species.

LOGANIA, Distant.

LOGANIA REGINA.

*Miletus regina*, Druce, P. Z. S. 1873, p. 348, pl. xxxii. fig. 4.

Labuan (*Low*); Sandakan (*Pryer*).

This species, which together with *L. lahomius*, Kheil, is a true *Logania*, is closely allied to *L. sriwa*, Distant, from which it principally differs by the inner marginal area of the fore wing below being white; in *L. sriwa* it is blackish brown. The type, a male, is now in Messrs. Godman and Salvin's collection.

## LOGANIA OBSCURA.

*Logania obscura*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 266 (1887).

Sandakan (Pryer).

It is, I fear, impossible to make out the species from the description given.

LOGANIA STAUDINGERI, sp. n. (Plate XXXI. figs. 13 ♂, 14 ♀.)

♂. Upperside: fore wing pale greyish blue, costal margin rather broadly, apex and outer margin broadly black; hind wing black. Underside: fore wing blackish grey, the costal margin and apex, as also a narrow outer-marginal line, rufous brown; a broad brown fascia crossing the cell just beyond its middle, and another much the same at the end of the cell: hind wing rufous brown, with two sinuous median bands crossing the wing from about the centre of the costal margin to the anal margin; these bands are rather darker brown than the ground-colour, and edged on both sides with black lines; the centre of the costal margin, as also the outer margin from its middle towards the anal angle, clouded with black.

♀. Upperside pale greyish white, apex broadly brown, narrowing towards angle: hind wing greyish; costal margin rather broadly, outer margin very narrowly fuscous. General appearance much like *L. sriwa*, Dist., ♂. Underside as male but paler.

Expanse, ♂ ♀,  $1\frac{1}{5}$  inch.

Kina Balu (*Waterstr.*). Mus. Staud.

The disc of the fore wing in the male is nearly as blue as in *A. subviolaceus*, Feld.

## CYANIRIODES, de Nicév.

v. de Nicév. Butt. Ind. etc. iii. p. 33 (1890).

## CYANIRIODES LIBNA, Hew.

*Hypolyceana libna*, Hew. Ill. Diurn. Lep., *Lyc.* Supp. p. 15, pl. v. (Supp.) figs. 39, 40, ♀ (1869).

♂. Upperside dark shining emerald-green: fore wing—costal margin rather narrowly, outer margin broadly, black; a black quadrate spot at the end of the cell confluent with the black costal margin: hind wing—apex narrowly, outer margin and anal fold broadly, black; costal margin greyish; an oval shining patch below and adjoining the subcostal nervure just before the middle, on which lies a short tuft of black hairs, which appears to be attached to the membrane of the wing close to the subcostal nervure; there is also a small tuft of black hairs placed close to the base, which are directed upwards, and are partially covered by the fore wing. Underside as ♀. There are no tails.

Sandakan, Borneo (*Hew.*).

Mr. H. J. Elwes has kindly sent me for examination a male of

this interesting and rare species, which I have described above. I find it impossible to make out the neuration correctly without clearing the wing of scales; but the possession of the tufts of hair seems to show that it is closely allied to *Poritia*, next to which I have placed it.

The type in the Hewitson collection, which is in poor condition and has lost its abdomen, is the only female I have seen. On the underside the markings are somewhat like those of *Poritia*, but the wings are less thickly covered.

#### PORITIA, Moore.

When Mr. Herbert Druce wrote his list of Bornean butterflies, one species only of this beautiful group was known from the country, but shortly after Hewitson described two (1874). I am able to include four new species, which, together with representatives of species described principally from other localities, brings the number up to about ten.

#### PORITIA SUMATRÆ.

*Pseudodipsas sumatræ*, Feld. Reise Nov., Lep. vol. ii. p. 259, pl. xxxvi. figs. 24-26 (1865); Druce, P. Z. S. 1873, p. 351.

Labuan (*Low*).

A single male in Messrs. Godman and Salviu's collection is my only authority for including this well-known species.

#### PORITIA PHORMEDON, sp. n. (Plate XXXI. figs. 16 ♂, 17 ♀.)

♂. Upperside brilliant emerald-green, closely allied to *P. hewitsoni*, Moore, from which it differs by the fore wing possessing a broad, arched, green streak along the upper wall of the cell, extending from the base nearly to the end, sharply defined at its extremity; the black spot in the submedian interspace is large and prominent. Underside greyer, with the bands broader and more regular, and with their edges less distinctly prominent.

♀. Upperside: fore wing entirely without the ochreous which is usually present in that sex of *P. hewitsoni*, and without the brown streak which is usual in the submedian interspace of that species; the blue streak in the cell as described in the male is very prominent, and is entirely absent in *P. hewitsoni*: hind wing with a small ochreous streak in the cell at its outer extremity. Underside as male, but paler.

Expanse, ♂ ♀,  $1\frac{7}{10}$  inch.

Kina Balu (*Waterstr.*). Mus. Staudinger.

*P. phormedon* is the Bornean representative of *P. hewitsoni*, and presents sufficient differences to be considered distinct. It is also a much larger insect. Dr. Staudinger writes me that he has only received a pair.

#### PORITIA PELLONIA.

*Poritia pellonia*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 265 (1887).

## Sandakan.

I have not seen this species; on the underside it is said to be similar to *P. pleurata*, Hew., from Singapore.

## PORITIA PHALUKE, sp. n. (Plate XXXI. fig. 15 ♂.)

♂. Upperside: fore wing rich ultramarine-blue, with a large oblong black patch about the middle of the costa, which is also black, extending downwards to the median nervure; apex and outer margin black, irregularly serrated on its inner edge: hind wing black, with a rather broad central ultramarine-blue streak extending from the base nearly to the outer margin, sharply bordered on its upper edge by the median nervure. Underside much like that of *P. phraatica*, Hew., but the ground-colour much whiter and the markings somewhat narrower, and the bands more broken and with their edges darker and more conspicuous.

♀. Upperside brown, with dark margins much as in *P. phraatica*. Underside as male, but paler.

Expanse  $1\frac{2}{3}$  inch.

Kina Balu (*Waterstr.*). Mus. Staudinger.

The female appears to be identical with the type of Hewitson's *P. phraatica*; but the male is very different from the male of that species which I have before me from Malacca (*Eichorn*), and which has been described by Mr. Distant. By the single streak on the hind wing it seems to be allied to *P. pellowia*, Dist. & Pryer.

## PORITIA PHILOTA.

*Poritia philota*, Hew. Trans. Ent. Soc. 1874, p. 346; Ill. Diurn. Lep., *Lyc.* p. 217, pl. 89. fig. 20 (1878).

Labuan (*Wahnes*); N.E. Borneo (*Mus. G. & S.*).

I have received specimens which are identical with Hewitson's type from Sumatra; we also possess a male from Java. Messrs. Godman and Salvin's collection also contains a pair from Borneo, and a single male from the Philippine Islands (*Pryer*)<sup>1</sup>. The female is dull brown, slightly ochreous on the disc of the fore wing, and towards the outer margin of the hind wing; on the underside it is much paler than the male.

## PORITIA PLATENI.

*Poritia plateni*, Staud. Iris, ii. p. 104, pl. i. fig. 8 (1889).

Kina Balu (*Waterstr.*).

<sup>1</sup> Dr. Staudinger has sent another form which I believe is distinct and describe as below:—

## PORITIA PHARE, sp. n. (Plate XXXIV. fig. 14 ♂.)

♂. Upperside allied to *P. philota*, but larger, and with the blue streak in the cell replaced by a small blue spot about its middle, close to the subcostal nervure. Underside: ground-colour pale grey, with the bands and spots much as in *P. philota* and standing out prominently.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Mindanao, Davao (*Platen*). Type Mus. Staud.

This species should be at once distinguished from *P. philota* by the pale ground of the underside, thus throwing up the markings prominently.

Through the kindness of Dr. Staudinger I have been able to examine two specimens from Borneo, and the type of the species which was obtained from the island of Palawan. I find that the irregular dark blotches vary slightly in intensity and shape; indeed, in neither one of the specimens are they alike in the corresponding wings. The species should be easily recognized, as it is quite unlike any other in the genus. It is a true *Poritia*, as defined by Mr. de Nicéville.

*PORITIA PHAMA*, sp. n. (Plate XXXI. fig. 18 ♂.)

♂. Fore wing, upperside brilliant greenish blue, apex and outer margin down to lower median nervule broadly black, then narrowly black; a quadrate black spot at the end of the cell adjoining the black costa and evenly bordered by the end of the cell, the third median nervule, and towards the apex by a short band of blue which is intersected by black nervules. Hind wing greenish blue, costal third and anal fold greyish; a marginal row of small black spots between the nervules, most distinct towards the anal angle. Underside much like *P. phormedon*, but with the markings of a more reddish hue.

Expanse  $1\frac{3}{10}$  inch.

Kina Balu (*Waterstr.*).

I have a specimen before me belonging to Dr. Staudinger labelled "Vulcan Gede, West Java," which I take to be this species; it agrees exactly with Bornean specimens on the upperside, but on the underside the bands are straighter and somewhat more compressed together, thus leaving broader ground-spaces, and are rather more reddish, but these are peculiarities which I have noticed in *P. hewitsoni*, Moore.

*PORITIA PHALENA*.

*Poritia phalena*, Hew. Trans. Ent. Soc. 1874, p. 344; Ill. Diurn. Lep., *Lyc.* p. 216, pl. lxxxix. figs. 14, 15 (1878).

♀. *Simiskina solyma*, de Nicév. J. A. S. B. vol. lxiii. pt. ii. no. 1, p. 29, pl. iv. fig. 10 (1894).

Labuan (*Waterstr.*). ♂ ♀.

The male received from Labuan agrees exactly with Hewitson's type in the British Museum, and the female with Mr. de Nicéville's description and figure of *S. solyma*, excepting that the discal spot is not quite so clearly white in any light. So far as I can tell the neuration agrees with that of *Poritia*, but the tuft of long black hairs attached to the base of the submedian nervure in the hind wing is wanting, and I notice that Mr. Doherty in describing a near ally, viz. *P. hartertii*, from Upper Assam, does not mention this patch. Why Mr. de Nicéville should place his insect (a female) in the genus *Simiskina* I do not know.

The sexes are remarkable for the disparity in size, the male before me measuring  $1\frac{1}{5}$  inch, the female  $1\frac{7}{10}$  inch.

The species has not been recorded since Hewitson obtained the type.

## PORITIA PHERETIA.

*Poritia pheretia*, Hew. Trans. Ent. Soc. 1874, p. 346; Ill. Diurn. Lep., *Lyc.* p. 217, pl. lxxxix. figs. 16, 17, 18 (1878).

Sandakan.

Mr. H. J. Elwes has sent me for examination a single female specimen which is referable to this species.

## PORITIA PHALIA.

*Poritia phalia*, Hew. Trans. Ent. Soc. 1874, p. 345; Ill. Diurn. Lep., *Lyc.* p. 216, pl. lxxxviii. figs. 10, 11 (1878).

Borneo (*Low*).

This species is known to me only by the type in the British Museum.

## PORITIA PHILURA, sp. n. (Plate XXXII. fig. 1 ♂.)

♂. Upperside jet-black, with brilliant greenish-blue patches and spots arranged much as in *Simiskina pharyge*, Hew., but generally larger; the central streak in the fore wing, which in *S. pharyge* is comparatively straight, is bent upwards at the base of the first median nervule and occupies the upper half of the cell: costal margin of hind wing from base nearly to apex broadly pale orange; tuft of hairs near base black. Underside uniform yellowish buff: fore wing with a thin dark streak at the end of the cell, a central irregular line composed of minute white spots inwardly bordered with black, halfway between this and the margin a faint parallel line composed of dull reddish lunules, a reddish anteciliary line; cilia black: hind wing as described above, but the first two spots of the central line which commences on the costal margin large and distinct, a narrow black line inwardly bordering the reddish anteciliary line, and within that towards the anal angle a greyish sinuous line; cilia black at the tips of the nervules, greyish in between. Head, thorax, and abdomen black above, yellowish beneath; legs black, spotted with yellow above, yellow below.

Expanse  $1\frac{2}{5}$  inch.

Kina Balu (*Waterstr.*). Type Mus. Staud.

Dr. Staudinger has sent me this distinct species and writes that it is unique. So far as I can see it agrees with *Poritia* in neuration, but is without the tuft of long hairs at the base of the submedian nervure of the hind wing, which is present in typical *Poritia*, nor has it the tuft of hairs below the cell which is said to be a distinctive character of *Simiskina*. *P. philura* is distinguished from *S. pharyge* on the upperside by the yellow costal margin of the hind wing, and is very different below.

## SIMISKINA, Distant.

## SIMISKINA PHARYGE.

*Poritia pharyge*, Hew. Trans. Ent. Soc. 1874, p. 345; Ill. Diurn. Lep. *Lyc.*, p. 215, pl. lxxxviii. figs. 8, 9, ♂.

*Simiskina pharyge*, de Nicév. Journ. Bombay Nat. Hist. Soc. 1891, p. 361, pl. F. fig. 11, ♀.

Labuan (*Wahnes*).

Specimens from Labuan, as also one from Java in our collection, agree well with Hewitson's type from Borneo. I have described below a new genus and species of this group from the Philippine Islands.<sup>1</sup>

#### PITHECOPS, Horsf.

##### PITHECOPS HYLAX.

*Papilio hylax*, Fab. Syst. Ent. p. 526 (1775).

Kina Balu (*Waterstr.*); Labuan near Banjarmasin, S.E. Borneo.

Mr. Doherty has also taken this species in Borneo (*vide* Butt. Ind. iii. p. 50).

#### NEOPITHECOPS, Distant.

##### NEOPITHECOPS ZALMORA.

*Pithecopis zalmora*, Butl. Cat. Fab. Lep. B. M. p. 161 (1869).

*Cupido talmora*, Druce, P. Z. S. 1873, p. 348.

Labuan (*Low*); S.E. Borneo (*Doherty*).

#### SPALGIS, Moore.

##### SPALGIS EPIUS.

*Lucia epius*, Westw. Gen. Diurn. Lep. vol. ii. p. 502, pl. lxxvi. fig. 5 (1852)<sup>2</sup>.

#### <sup>1</sup> PORISKINA, gen. nov.

Allied to *Poritia*, but with two subcostal nervures only to the fore wing; the first, which is emitted about the middle of the cell, is very short and runs into the costal nervure, the second is emitted about halfway between the first and the end of the cell. Two distinct tufts of hair in the cell of the hind wing; the upper one, which is composed of much the longest hairs, is placed close to the subcostal nervure, whilst the lower, which is smaller but very distinct, lies close to the median nervure a short distance from the base.

PORISKINA PHAKOS, sp. n. (Plate XXXIV. fig. 15 ♂.)

♂. Upperside pale cerulean blue, non-iridescent; fore wing—costal narrowly, apex and outer margin rather broadly dull brown; hind wing—costal and anal margins pale grey, outer margin rather narrowly dull brown: upper tuft of hairs white, lower tuft brown. Underside greyish white: fore wing glistening along inner margin up to lower median nervure; a pale orange spot in the cell at base of first median nervure, a narrow streak at the end of the cell and beyond, at about the middle a broken irregular band composed of irregular pale orange spots with narrow brown edges, and beyond this two exceedingly sinuous brown lines: hind wing as fore wing, but with an additional band of pale yellow spots placed about halfway between the base and the median band. Head, thorax, and abdomen bluish above, white beneath. Legs white, spotted with black.

Expanse 1½ inch.

*Hab.* Mindanao, Davao (*Platen*). Mus. Staud.

Dr. Standinger has sent me this very distinct insect, which is not closely allied to any with which I am acquainted. It should be easily distinguished from all others by the absence of the third subcostal nervure, and by the non-iridescent blue.

<sup>2</sup> I have carefully examined the type of *S. dilama*, Moore, which is in Messrs. Godman and Salvin's collection, and find that it differs only from Sikkim specimens in the ground-colour being slightly paler. It is in very poor condition, and I quite fail to see how Mr. Moore can have considered it in any way distinct.

Kina Balu (*Waterstr.*).

Dr. Staudinger has sent me a male which differs from the typical form only by the disc of the fore wing below the white spot being slightly greyish.

SPALGIS NUBILUS.

*Spalgis nubilus*, Moore, P. Z. S. 1883, p. 522; Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 266 (1887).

Sandakan (*Pryer*); Labuan (*Wahnes*).

TARAKA, de Nicéville.

TARAKA HAMADA.

*Miletus hamada*, Druce, Cist. Ent. vol. i. p. 361 (1875).

Kina Balu (*Waterstr.*).

The type of this species is now in Messrs. Godman and Salvin's collection.

MEGISBA, Moore.

MEGISBA MALAYA.

*Lycæna malaya*, Horsf. Cat. Lep. E. I. C. p. 70 (1828).

Sandakan (*Pryer*).

*M. malaya* is also recorded from Borneo by Mr. de Nicéville, who states that it is the tailed form which occurs there (Butt. Ind. iii. pp. 61, 62).

CYANIRIS, Dalman.

I have no less than eight species of this genus to deal with, and after carefully examining all the described species, I am only able to recognize one as identical with one of these forms, viz. *C. lambi*, Distant, and am compelled with some reluctance to propose names for the remainder, notwithstanding Dr. Holland's remarks about them in the Proc. Boston Soc. Nat. Hist. 1890, p. 70.

CYANIRIS DILECTISSIMA, sp. n. (Plate XXXII. figs. 2 ♂, 3 ♀.)

*Lycæna dilectissima*, Staud. MS.

♂. Upperside allied to *C. albocæruleus*, Moore, but darker and greyer blue; the fore wing with the outer margin and apex narrowly black (about as in *C. argiolus*, Linn.), and with only a few whitish scales on the costa and on the disc: hind wing pure white, dusted with blue (thickly) at the base, along the outer margin, inside the black anteciliary line, and along the nervules; cilia pure white. Underside with spots and markings as in *C. albocæruleus*, but larger, blacker and more distinct, and with distinct black linear marks closing the cells of both wings: fore wing with a marginal row of black spots; hind wing with a similar row larger and blacker.

♀. Upperside differs from that sex of *C. albocæruleus* by the black outer marginal border of fore wing being broader and less clearly defined, and by the costal margin of hind wing being broadly (to the subcostal nervure) greyish black from base to apex.



Underside as male. The black marginal spots of the hind wing are seen through to the upper surface in both sexes, but are more noticeable in the female. The bases of both wings on upperside in female are slightly dusted with bluish scales.

Expanse, ♂  $1\frac{3}{10}$ , ♀  $1\frac{3}{10}$ – $1\frac{1}{7}$  inch.

Kina Balu (*Everett and Waterstr.*). Mus. Staud. and Druce.

*C. dilectissima* should be distinguished by its narrow black apex, by the absence of the white disc on the fore wing on its upperside, and by the distinct rows of black spots on the margins and the generally larger markings below. It is also allied to the recently described *C. ceyx*, de Nicéville, from Java<sup>1</sup>.

#### CYANIRIS PUSPA.

*Polyommatus puspa*, Horsf. Cat. Lep. E. I. C. p. 67 (1828).

*Cupido cagaya*, Druce, P. Z. S. 1873, p. 348.

*Cyaniris lambi*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 266 (1887).

Labuan (*Low*); Sandakan (*Pryer*).

I have seen one specimen only of this species from Borneo, a male, which was identified by Mr. Herbert Druce as *C. cagaya*, Feld., and is now in Messrs. Godman and Salvin's collection. This specimen is identical with one from Malacca, also in these gentlemen's possession, marked "*C. lambi*" by Mr. Distant. I do not know how *C. cagaya* can be distinguished from *C. puspa*. The broad-bordered and the narrow-bordered forms occur together in the Philippine Islands, both with and without white discs. What I take to be the typical *C. cagaya* is the broad-bordered form of the 'Novara' Voyage, and which now stands in the Felder collection marked "*lalage*," which appears to have been affixed to it in error, as I could find no specimen marked "*cagaya*."

CYANIRIS PLACIDULA, sp. n. (Plate XXXII. figs. 6 ♂, 7 ♀.)

♂. Closely allied to *C. placida*, de Nicév. Upperside darker blue, with the outer margins more broadly black and less sharply defined inwardly; costal margin of hind wing much more broadly black. Underside differs from *C. placida* by the discal band of spots in the fore wing being more in line and, towards the outer angle, reaching close to the submarginal line. The submarginal lines in both wings are composed of less distinctly crescent-shaped striæ than in *C. placida*.

♀. Upperside broadly black-bordered, bluish on the discs, both wings with a black mark closing the cell; fore wing with a whitish blotch beyond the end of the cell; hind wing with a marginal row of lunules enclosing black marginal spots. Underside as male.

Expanse, ♂  $1\frac{1}{2}$ – $1\frac{3}{10}$ , ♀  $1\frac{1}{5}$  inch.

Kina Balu (*Waterstr.*). Type Mus. Staud. and Druce.

Apparently plentiful where it occurs. There seems to be practically no variation, judging from the specimens I have examined.

<sup>1</sup> *C. ceyx*, de Nicév. Journ. Bomb. Nat. Hist. Soc. vol. vii. p. 329, figs. 6, 7 (1892).

## CYANIRIS LUGRA, sp. n. (Plate XXXII. fig. 5 ♂.)

♂. Allied to *C. placida*, de Nicév., much smaller. Upperside uniform dull greyish silvery blue, margins more narrowly black, cilia greyish. Underside pale brownish grey, with the spots and markings arranged as in *C. placida*, but with the exception of two on the costa and the marginal row, also on the hind wing, which are blackish, of a dull brownish grey, but slightly darker than the ground-colour.

Expanse  $1\frac{1}{10}$  inch.

Kina Balu (*Waterstr.*). Mus. Staud. and Druce.

This is a small, dull-coloured butterfly, which appears to be distinct from any described. I have not seen the female. Below will be found described another species which I believe to be new<sup>1</sup>.

## CYANIRIS SELMA, sp. n. (Plate XXXII. fig. 10 ♂.)

♂. Allied to *C. celestina*, Kollar. Upperside pale shining silvery blue, brighter and more shining than in that species; black apical border slightly wider. Underside: spots arranged as in *C. celestina*, with the addition of faint marginal rows of spots which are most conspicuous in the hind wing. The two black spots close to the costal margin on the hind wing, which in *C. celestina* are usually not more noticeable than the other spots on the wing, are in this species larger and more conspicuous than any others. The marginal row of spots on the hind wing shows through to the upper surface. Cilia shorter.

Expanse  $1\frac{1}{10}$  inch.

Kina Balu (*Waterstr.*). Type Mus. Staud.

*C. selma* should be easily distinguished from *C. celestina* by its brighter blue upperside. I have not seen the female.

## CYANIRIS STROPHIS, sp. n. (Plate XXXII. fig. 4 ♂.)

♂. Upperside deep lavender-blue, colour of *C. placida*, which it closely resembles, having, however, narrower and more even black margins. The underside exactly as in *C. dilectissimu*, mihi, but the spots and markings not quite so deeply black.

Expanse  $1\frac{3}{10}$  inch.

<sup>1</sup> CYANIRIS PIUSTE, sp. n. (Plate XXXIV. fig. 17 ♂.)

Upperside dull violaceous blue, rather greyer than *C. placida*, which it resembles on the upperside, with rather broader black borders. Underside greyish white, with a linear dark streak closing the cell of each wing, a very faint, scarcely perceptible zigzag line crossing the wings beyond the middle, then a darker submarginal line composed of crescent-shaped marks enclosing a marginal row of dark spots common to both wings and darkest towards anal angle of hind wing; a very fine anteciliary dark line to both wings. Cilia grey, with dark spots at the termination of the nervules.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Dili (*W. Doherty*). Type Mus. Druce.

This is not the *C. duponchellii*, Godt., which we have also from Dili, obtained by Mr. Doherty, and which is close to *C. puspa* on the upperside, and has the lower spot of the discal series on the fore wing below enlarged into a considerable blotch.

Kina Balu (*Waterstr.*). Type Mus. Stand.

Can this be a seasonal form of *C. dilectissima*? On the underside they are almost identical, but on the upperside the hind wings are strikingly different.

CYANIRIS PLAUTA, sp. n. (Plate XXXII. figs. 8 ♂, 9 ♀.)

*Lycæna plauta*, Stand. MS.

♂. Upperside deep lavender-blue, colour of *C. placida*, with black costa, apex, and outer margin much as in *Lycænopsis haraldus*, Fab. (to which it bears a general resemblance, without possessing the beautiful opalescent shading of that species), but the blue area more extensive: hind wing deep lavender-blue, outer margin very narrowly black, with a marginal row of elongate black spots; costal margin broadly black to near its apex, where it becomes white, a large white patch below this occupying nearly the whole of the subcostal interspace except the black outer margin: anal fold whitish. Underside: ground-colour white tinged with pale yellow as in *L. haraldus*, with black spots arranged much as in *C. placida*, large and distinct; the black spot on the middle of the costa of hind wing is unusually large and conspicuous.

♀. Upperside resembling *C. albidisca*, Moore, ♀, but without the black streak closing the cell of the fore wing, and with the whole of the white area of the fore wing as well as the abdominal half of the hind wing shot with beautiful opalescent blue; the black marginal spots on hind wing become more separated and distinct towards the anal angle. Underside as male.

Expanse, ♂  $1\frac{3}{5}$ , ♀  $1\frac{3}{5}$ – $1\frac{3}{10}$  inch.

Kina Balu (*Waterstr.* and *Everett*); Labuan (*Low*). Mus. Stand. and Druce.

Some females from Kina Balu are not so strongly marked on the underside as others, whilst a female from Labuan in Messrs. Godman and Salvin's collection has the outer margin of hind wing above broadly black-bordered. It seems a distinct species, and the yellowish tinge of the underside may perhaps serve to link it with the species which I have placed in the next genus.

CYANIRIS RIPTÉ, sp. n. (Plate XXXII. fig. 11 ♂.)

♂. Upperside bright shining violaceous blue, with a pinkish tinge and black margins about equal to those of *C. placida*. Underside pale brown, slightly paler only than the ground-colour of *Jamides bochas*, Cr., ♀, with sordid-white-edged spots and markings, which are rather darker brown than the ground-colour, arranged as in *C. puspa*, with the addition of a double spot in the centre of the cell of the fore wing. The black spot just beyond the middle of the costal margin on the hind wing is large and prominent.

Expanse  $1$ – $1\frac{1}{5}$  inch.

Labuan (*Low*). Type Mus. G. & S.

*C. ripté* differs from all others in the shade of blue on the upperside, and is, I believe, the only *Cyaniris* known which has a

spot in the cell of the fore wing below; this spot, I find, is not always double as described above, sometimes single, but always distinctly present.

#### LYCÆNOPSIS, Feld.

This genus is very, perhaps too close to *Cyaniris*, under which name it has been sunk by Mr. Distant. On bleaching the wings of a male the only differences in venation which I can discover are in the hind wing, in which the first median nervule and the subcostal nervule are both longer than in *C. argiolus*, Linn., being emitted higher up the wing. This character, however, is probably not of much importance.

#### LYCÆNOPSIS HARALDUS.

*Papilio haraldus*, Fab. Mant. Ins. vol. ii. p. 82 (1787).

*Cupido cornuta*, Druce, P. Z. S. 1873, p. 349, pl. xxxii. fig. 5, ♀.

Labuan (*Low and Wahnes*).

Apparently a scarce insect in Borneo, as I have seen three female specimens only—two, including the type of *C. cornuta*, which does not differ in any way from females from Malacca and Java, in Messrs. Godman and Salvin's collection, and one sent by Dr. Staudinger.

#### ZIZERA, Moore.

*Zizera* is a genus which appears to be very poorly represented in Borneo, and I am able to include only one species here.

#### ZIZERA OTIS.

*Papilio otis*, Fab. Mant. Ins. vol. ii. p. 73 (1787).

*Zizera lysizone*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Labuan (*Wahnes and Waterstr.*); Sandakan (*Pryer*).

Bornean specimens show the same amount of variation on both surfaces as obtains in the species from other localities.

#### LYCÆNESTHES, Moore.

#### LYCÆNESTHES EMOLUS.

*Polyommatus emolus*, Godt. Enc. Méth. vol. xix. p. 656 (1823).

*Pseudodipsas bengalensis*, Druce, P. Z. S. 1873, p. 351.

Labuan (*Low and Wahnes*); S.E. Borneo (*Wahnes*).

#### LYCÆNESTHES LYCÆNINA.

*Lycænesthes lycænina*, Feld. Verh. zool.-bot. Gesellsch. Wien, vol. xviii. p. 281 (1868); Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

S.E. Borneo (*Wahnes*); Sandakan (*Pryer*).

We also possess a specimen, labelled "Borneo," which was formerly in the Rev. Mr. Murray's collection, and Mr. de Nicéville records it Butt. Ind. etc. p. 130 (1890).

## NIPHANDA, Moore.

NIPHANDA RETER, sp. n. (Plate XXXII. fig. 12 ♂.)

♂. Upperside shining dark violet as in *N. cymbia*, de Nicév., which it closely resembles. Underside: ground pure white with dark brown spots on the fore wing as in that species, but larger and more distinct, especially that one which lies beyond the basal streak, which is nearly twice as large as in *N. cymbia*. Hind wing with the spots arranged as in *N. cymbia*, but much larger; and without the brown mottling of that species.

Expanse  $1\frac{3}{10}$  inch.

Kina Balu (*Waterstr.*). Mus. Staud. and Druce.

At first sight the underside of this insect presents a very different appearance from *N. cymbia*, but on closer examination the spots appear to be similarly placed. The absence of all mottlings from the hind wing and the much larger spots, together with the pure white ground, should distinguish it.

## LUTHRODES, gen. nov.

Allied to *Talicaða*, Moore, from which it differs by the costal nervure of the fore wing being bent towards the first subcostal nervule, but entirely free for its whole length—not anastomosed as in that genus—and reaching the margin considerably before the apex of the cell.

Type *Polyommatus cleotas*, Guér.

I find on bleaching the wings that the species referred by myself (P. Z. S. 1891, p. 358, & 1892, p. 436) and others to *Talicaða* are not strictly congeneric and present the differences in neuriation described above. All the species of *Luthrodes* are tailless excepting *L. mindora*, Feld., which is tailed like *J. nyseus*, Guér.

## LUTHRODES MINDORA.

*Lycæna mindora*, Feld. Reise Nov., Lep. ii. p. 277, t. 34. figs. 9, 10 (1865).

*Cupido aruana*, Druce, P. Z. S. 1873, p. 349 (nec Feld.).

*Talicaða mindora*, Distant & Pryer, Ann. Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Labuan (*Low*); Sandakan (*Pryer*).

The two specimens which I have seen from Borneo are now in Messrs. Godman and Salvin's collection. They were incorrectly referred to *L. aruana*, Feld., which has larger spots below and is without tails. They are identical with specimens from Mindoro before me. Of course in the general arrangement of the nervules *Luthrodes* scarcely differs from *Lycæna*, *Cyaniris*, and others, but the peculiarity of coloration seems to suggest a distinctive feature, being intermediate between those genera and *Talicaða*.

## EVERES, Hübn.

## EVERES ARGIADES.

*Papilio argiades*, Pallas, Reise, vol. i. App. p. 472 (1771).

*Polyommatus lacturnus*, Godt. Enc. Méth. ix. p. 66 a (1823).

*Cupido lacturnus*, Druce, P. Z. S. 1873, p. 348.

Kina Balu (*Waterstr.*); Labuan (*Low*).

I have no hesitation in placing *P. lacturnus*, Godt., as a synonym of *E. argiades* after examining specimens from Timor. The species is also a very common one in New Guinea, where the females are sometimes pale grey with darker borders, and where it varies much in size, one male in Messrs. Godman and Salvin's collection measuring only slightly more than  $\frac{1}{2}$  inch.

## NACADUBA, Moore.

## NACADUBA PAVANA.

*Lycæna pavana*, Horsf. Cat. Lep. E. I. C. p. 77 (1828).

Kina Balu (*Waterstr.*); Sandakan (*Pryer*); Labuan (*Low*).

Specimens from Kina Balu are darker on both surfaces than those from the other localities.

NACADUBA LUGINE, sp. n. (Plate XXXII. fig. 15 ♂.)

*Cupido pactolus*, Druce, P. Z. S. 1873, p. 348 (nec Feld.).

♂. Allied to *N. macrophthalma*, Feld.; rather larger. Upper-side brighter and more violaceous blue, and with scarcely any silvery gloss. Underside pale rufous brown, with the fasciæ narrower, paler, and in the fore wing much more irregularly broken, so that there is no distinct Y. The black spot between the lower median nervules is larger and more broadly edged with rich dark orange.

Expanse  $1\frac{3}{5}$  inch.

Labuan (*Low*). Type Mus. G. & S.

On comparing this species with the type of *L. pactolus*, Feld., to which it was referred by Mr. Herbert Druce in his paper on Bornean Butterflies, I find that it is quite distinct, and, as I can find nothing else like it, am compelled to describe it as new.

Messrs. Godman and Salvin's collection contains another small female specimen of a species belonging to this group, which on the upperside resembles that sex of *N. atrata*, Horsf., and on the underside is much like *N. pavana*, Horsf., but until the male is discovered I do not care to propose a name for it. It expands  $1\frac{1}{10}$  inch and is from Sandakan.

## NACADUBA ANGUSTA.

*Cupido angusta*, Druce, P. Z. S. 1873, p. 349, pl. xxxii. fig. 9.

Labuan (*Low*).

Messrs. Godman and Salvin's collection contains the type of this species. The figure given is quite useless and misleading and hardly bears any resemblance to the insect. In it the wings appear to be dark grey with yellow borders and black markings

and spots, whereas the ground-colour is very pale yellowish grey with pale brown fasciæ and a double row of black marginal spots to each wing; the two spots nearest to the anal angle sprinkled with blue scales. The upperside is dull violaceous silvery blue. Possibly *N. kerriana*, Distant, is conspecific with *N. angusta*, but unfortunately I have not a specimen for examination. The underside of the figure given in Rhop. Malay. appears to agree well with that of *N. angusta*, but the upperside has a broader black outer margin.

*N. azureus*, Röber, as figured by Herr Semper (Reise Philip. Insel. p. 177, pl. xxxiii. figs. 1, 2), and which we possess from S. Celebes (*Doherty*), is a closely allied species. Herr Röber's figure and this one, however, do not agree very well.

#### NACADUBA ATRATUS.

*Lycæna atratus*, Horsf. Cat. Lep. E. I. C. p. 78 (1828).

*Cupido akaba*, Druce, P. Z. S. 1873, p. 350.

Kina Balu (*Waterstr.*); Labuan (*Low*); S.E. Borneo, near Banjarmasin (*Wahnes*).

Kina Balu specimens are slightly darker on the upperside than those from Labuan and S.E. Borneo. I have examined the type of *C. akaba*, and can find no character to distinguish it.

#### NACADUBA BEROË.

*Lycæna beroë*, Feld. Reise Nov., Lep. ii. p. 275, pl. xxxiv. fig. 36 (1865).

*Nacaduba beroë*, Distant & Pryer, Ann. Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Sandakan (*Pryer*).

I include *N. beroë* here on the authority of Messrs. Distant and Pryer. Typically, I think it can be distinguished from *N. atratus* by the paler ground-colour of the underside and by the fascia being much wider.

#### NACADUBA BHUTEA.

*Nacaduba bhutea*, de Nicév. J. A. S. B. vol. lii. pt. 2, p. 72, pl. i. fig. 13 (1883).

Kina Balu (*Waterstr.* and *Everett*); Labuan (*Low*).

The ground-colour of the Bornean examples I have examined is ochreous on the underside.

#### NACADUBA ARDATES.

*Lycæna ardates*, Moore, P. Z. S. 1874, p. 574, pl. lxvii. fig. 1.

Sandakan (*Pryer*); Labuan (*Low*).

The tailed form only.

NACADUBA ALUTA. (Plate XXXII. figs. 13 ♂, 14 ♀.)

*Cupido aluta*, Druce, P. Z. S. 1873, p. 349, pl. xxxii. fig. 8.

Sandakan (*Pryer*); Labuan (*Low* & *Wahnes*).

The figure given in the P. Z. S. is a very bad one and bears but slight resemblance to the insect. It is, in my opinion, although

allied to *N. ardates*, quite distinct. On the upperside it is much like *N. atratus* (dry-season form) in colour and general appearance, whilst *N. ardates* is a totally different shade, being dark violaceous brown. On the underside, although the markings are placed as in *N. ardates*, they are always pure white. The female is dull blackish brown on the upperside, with the disc of the fore wing light shining blue and with an outer-marginal row of black spots on the hind wing most conspicuous; the underside is paler in colour than the male, and the double marginal row of black lunules is more distinct. Mr. Distant has probably figured and described specimens of *N. ardates* as *N. aluta* in his 'Rhopalocera Malayana.' I hope the above remarks will enable the species to be distinguished when met with. It is not an uncommon insect in Borneo, but I have seen no specimens from any other locality. Messrs. Godman and Salvin possess the type and other specimens, whilst Dr. Staudinger has also sent it. The type measures fully 1 inch, whilst the figure barely reaches  $\frac{4}{5}$  inch.

Messrs. Distant and Pryer record *N. aluta* from Sandakan (Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267), but as Mr. Distant has not recognized the species, probably not having seen the type, without which it was of course quite impossible to do so, they are probably referring to *N. ardates*<sup>1</sup>.

#### NACADUBA ANCYRA.

*Lycæna ancyra*, Feld. Reise Nov. Lep. p. 276, t. 34. fig. 5 (1865).

*Cupido almora*, Druce, P. Z. S. 1873, p. 349, pl. xxii. fig. 7.

*Nacaduba pseustis*, Doherty, J. A. S. B. vol. lx. pt. ii. p. 182 (1891).

Kina Balu (*Waterstr. & Everett*); Labuan (*Low*); S.E. Borneo (*Doherty*).

The figure given of *C. almora* is misleading. I have examined the type of *L. ancyra* in the Felder collection and find that *C. almora*, Druce, the type of which ( $\sigma$ ) is in Messrs. Godman and Salvin's collection, is identical with it. Mr. Doherty has also described it as *N. pseustis*<sup>2</sup>.

#### UNA, de Nicév.

Butt. Ind. etc. iii. p. 51 (1890).

#### UNA USTA.

*Zizera? usta*, Distant, Ann. & Mag. Nat. Hist. ser. 5, vol. xvii. p. 531 (1886); Rhop. Malay. p. 454, pl. xlv. fig. 5 (1886).

<sup>1</sup> Dr. Staudinger has kindly sent me for examination the type of his *Lycæna ardeola* from Palawan (Iris, ii. p. 97, 1889), which must be sunk as a synonym of *N. dana*, de Nicév., with which it is identical.

<sup>2</sup> *N. amaura*, H. H. Druce (P. Z. S. 1891, p. 361, pl. xxxi. fig. 10), from the Solomon Is., should be sunk as a synonym of *N. ancyra*, as also probably should *N. gaura*, Doherty, from Sumba (J. A. S. B. vol. lx. p. 181, 1891), which is stated (p. 182) to be something like *Lycæna palmyra*, Feld. I cannot, however, see any resemblance. An error has been made in numbering the figures on plate ii. in this part of the J. A. S. B.; fig. 9 (pl. ii.) should read fig. 11, and *vice versa*, as is evident from the descriptions on pp. 182-184. *N. maniana*, H. H. Druce (id. pl. xxxi. fig. 9), is also very close and should perhaps be considered a slight local race.



Kina Balu (*Waterstr.*).

Dr. Staudinger has sent me a fine specimen (♂) of what I take to be this interesting species; it differs slightly, however, from Mr. Distant's description of the underside as follows:—The fore wing has only one small fuscous spot in the middle of the cell; on the hind wing the fuscous spot beneath the outermost black spot on the costal margin and the fuscous spot in the cell are both wanting.

The genera *Una*, de Nicév., and *Prosotas*<sup>1</sup>, mihi, agree very closely in venation, but have a very different general appearance, whilst the palpi of *Prosotas* are shorter and the antennæ less spatulate.

#### JAMIDES, Hübn.

JAMIDES BOCHUS.

*Papilio bochus*, Cr. Pap. Exot. vol. iv. p. 210, pl. cccxci. figs. C, D (1782).

Kina Balu (*Waterstr.*); Labuan (*Low*).

All the Bornean males I have examined have the blue area of the fore wing much contracted.

#### LAMPIDES, Hübn.

After working carefully through the described species of this genus, I find four Bornean species which I am unable to match with any of them, and am, though with considerable reluctance, obliged to describe them here. Although Mr. de Nicéville has paid much attention to the genus, and, having seen some of Felder's types, has, in a paper (*Journ. Bombay Nat. Hist. Soc.* pp. 364–368, 1891) published after his 'Butterflies of India, etc,' considerably altered some statements made in that work, much yet remains to be done to put the genus into a satisfactory condition; and until some one has the opportunity to carefully compare the types of the numerous species described by Herr Röber in 'Iris' i., and those of Felder and others, I fear it will still be so. After carefully studying Herr Röber's figures I am of opinion that they are by far the best yet published of this difficult group and not, as has been stated, difficult to make out.

#### Group I.<sup>2</sup>

LAMPIDES ELPIS.

*Polyommatus elpis*, Godt. Enc. Méth. vol. xix. p. 654 (1823).

*Lampides elpis*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

*Cupido alecto*, Druce, P. Z. S. 1873, p. 348.

Kudat; Sandakan and Elopura (*Pryer*); Kina Balu (*Waterstr.*); Labuan (*Low*); Lawas (*Everett*).

<sup>1</sup> *Prosotas*, mihi, P. Z. S. 1891, p. 366. Type *P. caliginosa*, mihi, from the Solomon Is.

<sup>2</sup> I have arranged the species here according to the groups given by M. de Nicéville in *J. B. Nat. Hist. Soc.* pp. 365, 366 (1891).

I am unable to say how the true *alecto*, Feld., differs from this species, not having seen the type, but the specimens now before me from Labuan, referred to that species by Mr. Herbert Druce, are undoubtedly *L. elpis*.

Mr. de Nicéville (Butl. Ind. etc. vol. iii. p. 165) appears to have wrongly identified *L. pseudelpis*, Butler, as on examination of the type I find that the transverse striæ are arranged as in true *L. elpis*, but that the lower portion of No. 1 is slightly out of line and nearer the base; but there are no other differences, and I quite agree with Mr. Distant that it is a form of *L. elpis*. On the upperside the type of *L. pseudelpis* has a faint black linear border only.

LAMPIDES LIMES, sp. n. (Plate XXXII. fig. 16 ♂.)

♂. Upperside rich shining pale blue, much like *L. suidas*, Feld., but with the white bands of the underside showing more distinctly through than in that species; outer margins very narrowly black as in *L. suidas*. Underside: ground-colour rather dark grey, with white bands arranged much as in *L. elpis*—fore wing, the 1st and 2nd with white spots over them close to the costal margin; the 3rd and 4th much broken, both with their upper segments out of line and placed about halfway between the 2nd and 3rd and 3rd and 4th bands respectively; the 4th with two white spots above it close to the costal margin, one each side. Marginal and submarginal bands as in *L. elpis*. Hind wing with white bands arranged as in *L. elpis*, but more broken into segments.

Expanse  $1\frac{7}{10}$  inch. Type Mus. Staud.

Kina Balu (*Waterstr.*).

*L. limes* is a much richer colour on the upperside than *L. elpis*, and is, I believe, the only species of this group in which the 1st and 2nd bands of the fore wing are continued to the costal margin by separated white spots.

LAMPIDES VIRGULATUS, sp. n. (Plate XXXII. fig. 17 ♂.)

♂. Upperside much like *L. philatus*, Snell., having the dull appearance of that species, but bluer. Underside rather darker grey than in *L. limes*, with distinct, narrow, and comparatively straight white bands: the 1st and 2nd are parallel, and have two small spots between them close to the costal margin; the 3rd is very short, and extends from the costal margin to the upper discoidal; the 4th extends to the 2nd median nervule, and has a small spot each side of it close to the costa; the 4th is short and extends from the upper discoidal to the 3rd median nervule. The remaining bands are placed as in *L. elpis*. Hind wing as in *L. elpis*, but the white bands are all straighter.

Expanse  $1\frac{3}{10}$  inch.

S.E. Borneo, near Banjarmasin (*Wahnes*). Type Mus. Staud.

Although this species is much like *L. philatus* on the upperside, it is totally different on the underside. It appears to be distinct, and I hope can be recognized from the description given above.

## LAMPIDES CÆRULEA. (Plate XXXII. fig. 19 ♀.)

*Cupido cærulea*, Druce, P. Z. S. 1873, p. 349, pl. xxxii. fig. 6.

*Lampides cærulea*, H. H. Druce, Ent. Mo. Mag. ser. 2, vol. v. p. 9 (1894).

*Lampides bochides*, de Nicév. J. B. Nat. Hist. Soc. 1891, p. 367, pl. F. fig. 15.

Kina Balu (*Waterstr.*); Elopura (*Pryer*); Labuan (*Low*); S.E. Borneo, near Banjarmasin (*Wahnes*).

Two specimens before me, which I take to be females of this species, are paler shining blue on the upperside and the outer margins of both wings are evenly black bordered; the apex of the fore wing widest. On the underside the ground-colour is paler than the male, and the bands, which are arranged exactly as in the male, are wider and pure white.

## LAMPIDES ABDUL.

*Lampides abdul*, Distant, Rhop. Malay. p. 456, pl. xlv. fig. 22 (1886); Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Sandakan (*Pryer*).

Mr. de Nicéville states that this species belongs to this group (Butt. Ind. etc. iii. p. 166, 1890). I have not seen a specimen.

## Group II.

## LAMPIDES OSIAS.

*Plebeius osias*, Röber, Iris, i. p. 56, pl. v. fig. 17 (1886).

*Lycæna amphyssina*, Stand. Lep. Palawan, p. 100, t. i. fig. 4, ♀ (1889).

Kudat; Labuan (*Low*); Sibutu (*Everett*).

Dr. Staudinger has kindly sent me the types of his *L. amphyssina*, which do not differ in the slightest from *L. osias*, which, as has been already pointed out by Herr Semper<sup>1</sup>, must be sunk as a synonym<sup>2</sup>.

<sup>1</sup> Schmett. Phil. Insel. p. 179 (1889).

<sup>2</sup> We possess a good series of a species belonging to this group, which I can find nowhere described, and propose to call it *L. emetallicus*, sp. n.

Allied to *L. amphissa*, Feld., ♂ ♀. Upperside as that species. Underside: ground-colour darker, the lines narrower and more irregular; the ground-colour between the two submarginal zigzag lines of the fore wing distinctly darker than the rest of the wing. Hind wing: a very small orange spot close to the margin, just above the submedian nervure; the black spot between the 1st and 2nd median nervules only, crowned with orange and without any metallic-blue scales whatever. Expanse as *L. amphissa*. Batchian (*Doherty*). Type Mus. Druce, also in Mus. S. & G.

Allied to *L. amphissa*, Feld., and *L. amphissina*, Grose Smith<sup>a</sup>, and also to *L. lucianus*, Röber, from which latter it differs in the arrangement of the white lines in the fore wing; but differing, so far as I know, from all others in the absence of all metallic scales near the anal angle of the hind wing below.

<sup>a</sup> *L. amphissina*, Grose Smith, Novitates Zoologicæ, vol. i. p. 577, 1894. Is not this name too near to "*amphyssina*" to stand?

## Group III.

## LAMPIDES CELENO.

*Papilio celeno*, Cr. Pap. Exot. vol. i. pl. xxxi. figs. C, D (1775).

*Cupido celeno*, Druce, P. Z. S. 1873, p. 348.

*Lampides celianus*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887), et auctores.

Labuan (*Low*); Sarawak (*Everett*).

Mr. de Nicéville appears to consider *L. celeno*, Cr., distinct from *L. celianus* (Journ. B. N. H. Soc. 1891, p. 366). The types of Mr. Herbert Druce's *L. agnata*<sup>1</sup> are before me, and are quite indistinguishable from the common form of *celeno*. The forms *alexis*, Stoll, and *conferenda*, Butl., seem to be quite unknown in Borneo<sup>2</sup>. I think that both Messrs. Distant and de Nicéville are wrong in placing *P.* (= *L.*) *malaccanus*, Röber, as a synonym of *L. celianus*, as the arrangement of the white bands on the hind wing is very different, the 4th band (from the base), which in *celianus* extends upwards to the 2nd median nervule, is in Herr Röber's figure entirely absent.

## LAMPIDES OPTIMUS.

*Plebeius optimus*, Röber, Iris, i. p. 56, pl. iv. fig. 16 (1886).

Kina Balu (*Waterstr.*); Elopura (*Pryer*); Lawas (*Everett*); Labuan (*Low*); Taganae I.

*L. optimus* scarcely differs from *L. cleodus*, Feld., on the upper-side, and on the fore wing below the white bands are arranged as in that species, but on the hind wing the 4th band (counting from the base) does not reach the costal margin, but stops short at the subcostal nervure. The outer margin of the hind wing of the female on the upperside appears to be not so strongly marked as in that sex of *L. cleodus*.

## LAMPIDES CLEODUS.

*Lycæna cleodus*, Feld. Reise Novara, Lep. ii. p. 272, pl. xxxiv. figs. 20, 21, 22 (1865).

Sandakan (*Pryer*).

Both sexes of this species are contained in Messrs. Godman and Salvin's collection, agreeing well with typical specimens.

## LAMPIDES ZEBRA, sp. n. (Plate XXXII. fig. 18 ♂.)

♂. Upperside very pale whitish blue, shining as in *L. cleodus*, but bluer. The apex of fore wing very slightly dusky. Hind wing sometimes unmarked, sometimes with a blackish streak near the anal angle. Underside: ground-colour rather dark grey, with pure white bands arranged as in *L. celeno* in both wings, but with the orange patch darker and much more extensive.

<sup>1</sup> *Cupido agnata*, Druce, P. Z. S. 1874, p. 106, pl. xvi. figs. 2-4.

<sup>2</sup> There are specimens in Messrs. Godman and Salvin's collection of the allied *L. evanescens*, Butl., from New Hebrides Is., which closely resemble the form *conferenda*, Butl.

♀. Upperside much like that sex of *L. cleodus*, but outer margin of fore wing generally broader brown and always without the white lunules towards the outer angle. On the hind wing the marginal spot in the first median interspace is often distinctly crowned with orange. Underside as male.

Expanse ♂  $1\frac{1}{2}$ – $1\frac{7}{10}$  inch, ♀  $1\frac{2}{5}$ – $1\frac{1}{2}$  inch.

Kina Balu (*Waterstr.*); Labuan (*Low*); Sarawak (*Everett*).

This is a puzzling species, and may perhaps hereafter be found to be a form of *L. celeno*, but the shining surface of the male and the unusual orange patch on the upperside which is often present in the female, markedly so in specimens from Kina Balu, seem to distinguish it. Several males from Labuan have the cilia only of the fore wing black, on the upperside.

#### LAMPIDES LIVIDUS, sp. n. (Plate XXXII. fig. 20 ♂.)

♂. Upperside uniform pale shining blue, with a decided pinkish tinge; cilia pale brownish. Underside pale greyish brown, with much broken, narrow white bands, arranged somewhat as in *L. osias*. Fore wing: a white band closing the end of the cell and another beyond it, commencing below the upper discoidal nervule and reaching the submedian nervure, missing, however, the space between the 2nd and 3rd median nervules; two parallel white bands from the subcostal nervure to the 2nd median nervule beyond the middle of the wing, and below these, commencing between them and running to the submedian nervure, another white band; two rows of indistinct parallel submarginal whitish lunules, and an anticiliary whitish line. Hind wing: bands and spots arranged much as in *L. osias*, but the submarginal row of sagittate markings (which in that species are black) scarcely definable, and but slightly darker than the ground-colour of the wing.

Expanse  $1\frac{7}{10}$  inch.

Labuan (*Low*).

In shape this species differs from all others described by the much more elongate fore wing, the costa being longer, the apex more produced, and the inner margin shorter.

The type specimen, which is in Messrs. Salvin and Godman's collection, is unique.

#### LAMPIDES ARATUS.

*Papilio aratus*, Cr. Pap. Exot. vol. iv. pl. cclxv. figs. *a*, *b* (1782).

Kina Balu (*Waterstr.*); Sandakan (*Pryer*).

♂. Quite typical. Female with brown outer marginal border to fore wing broader than the usual form from Amboina.

#### LAMPIDES ADANA.

*Cupido adana*, Druce, P. Z. S. 1873, p. 349.

Labuan (*Low*).

This is a very doubtful species, the male being indistinguishable

from that sex of *L. aratus*. It may perhaps be distinguished from that species by its female, which has the brown outer margin much broader and the hind wing brown with bluish scales and hairs at the base. The females were referred by Mr. Herbert Druce (P. Z. S. 1873, p. 348) to *L. aratus*. The *P.* (= *L.*) *snelleni*, var. *batjanensis*, Röber ('Iris,' i. p. 55, pl. iv. fig. 109), is contained in Messrs. Godman and Salvin's collection, and is identical on both surfaces with the females of *L. adana*<sup>1</sup>.

#### THYSONOTIS, Hübn.

##### THYSONOTIS SCHAEFFERA.

*Lycæna schaeffera*, Esch. Kotzeb. Reise, iii. p. 216, t. 5. fig. 25, a, b (1821).

*Cupido schaeffera*, Druce, P. Z. S. 1873, p. 348.

Labuan (*Low*).

The specimens obtained by Low are the only representatives I have seen from Borneo<sup>2</sup>.

#### CATOCHRYSOPS, Boisid.

##### CATOCHRYSOPS STRABO.

*Hesperia strabo*, Fab. Ent. Syst. vol. iii. pt. 1, p. 287 (1793).

*Catochrysops strabo*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Sandakan (*Pryer*); Labuan (*Low*); S.E. Borneo, near Banjarmasin (*Wahnes*).

##### CATOCHRYSOPS CNEJUS.

*Hesperia cnejus*, Fab. Ent. Syst. Suppl. p. 430 (1798).

*Cupido cnejus*, Druce, P. Z. S. 1873, p. 348.

Kina Balu (*Waterstr.*); Labuan (*Low*).

##### CATOCHRYSOPS PANDAVA.

*Lycæna pandava*, Horsf. Cat. Lep. E. I. Co. p. 84 (1829).

Kudat. Mus. Druce.

One female of the wet-season form.

#### TARUCUS, Moore.

TARUCUS WATERSTRADTI, sp. n. (Plate XXXII. fig. 21 ♀.)

♂. Upperside much like *T. theophrastus*, Fab., ♀, but with the

<sup>1</sup> Mr. Grose Smith has lately referred a male from Humboldt Bay to *L. batjanensis*, Röber, with some doubt ('Novitates Zoologicae,' vol. i. p. 578, 1894). It is doubtless, as he states, allied to *L. amphissa*, Feld., but has nothing to do with *L. batjanensis*.

<sup>2</sup> Unfortunately the figures of the neuration of this genus given by me on plate xlvii. P. Z. S. 1893 are useless, having been incorrectly drawn from the bleached wings by the artist; the first subcostal nervule has been omitted and the costal nervule drawn much too long, its extremity as shown being really part of the first subcostal.

blue area of the fore wing reaching to the outer marginal brown border. Underside perhaps nearest to *T. venosus*, Moore. Fore wing: basal streak shorter and much broader, and extending down to the submedian nervure, the streak beyond broader and placed at a greater angle, the spots beyond the middle more in line, the submarginal row distinctly separated, and the marginal row smaller. Hind wing: a broad basal streak from just below the costal margin to the anal angle; a broad streak beyond, also from the costal to the anal margin; then a series of spots as in *T. venosus*, which are more inclined to run parallel with the streaks; then a submarginal row of large distinct spots followed by a marginal row of small spots, the three upper being simply dots, the three lower gradually increasing towards the anal angle and dusted thickly with metallic green scales. The ground-colour of both wings is slightly tinged with yellowish and all the markings are black; the cilia of both wings black.

Expanse  $1\frac{1}{10}$  inch.

Kina Balu (*Waterstr.*). Type Mus. Staud.

*T. waterstradti* presents such differences on the underside from the Indian species, that I feel sure it is distinct.

#### TARUCUS PLINIUS.

*Hesperia plinius*, Fab. Ent. Syst. vol. iii. pt. 1, p. 284 (1793).

Lawas (*Everett*).

We possess one male obtained by Mr. Everett, which differs from Indian specimens by having broad and regular brown outer margins to both wings on the upperside, but is identical below. Messrs. Godman and Salvin's collection also contains this form from Minahassa.

#### CASTALIUS, Hübn.

##### CASTALIUS ROSIMON.

*Papilio rosimon*, Fab. Syst. Ent. p. 523 (1775).

Borneo (*Walnes*).

Dr. Staudinger has sent me this species, but the precise locality is not noted. It probably came from the neighbourhood of Labuan or from the S.E. of Borneo.

##### CASTALIUS ETHION.

*Lycæna ethion*, Doubl. & Hew. Gen. Diurn. Lep. vol. ii. p. 490, pl. lxxvi. fig. 3 (1852).

*Castalius ethion*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Sandakan (*Pryer*); Labuan (*Low*, *Walnes*, and *Waterstr.*); Lawas; Sarawak (*Everett*).

##### CASTALIUS ELNA.

*Lycæna elna*, Hew. Exot. Butt. vol. v. *Lycæna*, pl. i. fig. 8 (1876).

*Cupido roxus*, Druce, P. Z. S. 1873, p. 348 (nec Godt.).

*Lycæna elerna*, Staud. MS.

Kina Balu (*Waterstr.*); Elopura (*Pryer*); Labuan (*Wahnes* and *Low*).

The spots and bands vary in size and connections in the specimens before me, as noted by Mr. de Nicéville in Andamau examples.

#### CASTALIUS ROXUS.

*Polyommatus roxus*, Godt. Enc. Méth. vol. ix. p. 659 (1823).

Lawas (*Everett*).

We possess a single female obtained by Mr. Everett, which is my only authority for including the species here. *C. roxus* is stated by Felder and also by Mr. Doherty to have a short white band at the base of the costa on the underside of the hind wing, and is so figured by Mr. Distant in Rhop. Malay., but in all the specimens of *C. roxus* that I have examined the white streak is present in the fore wing only.

#### POLYOMMATUS, Latr.

##### POLYOMMATUS BÆTICUS.

*Papilio bæticus*, Linn. Syst. Nat. ed. xii. vol. i. p. 789 (1767).

*Polyommatus bæticus*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Kina Balu (*Waterstr.*, 1200–1500 m.); Sandakan (*Pryer*).

#### AMBLYPODIA, Horsf.

##### AMBLYPODIA NARADA.

*Amblypodia narada*, Horsf. Cat. Lep. E. I. C. p. 98, pl. i. fig. 8 (1829).

Sarawak.

A single male is contained in Messrs. Godman and Salvin's collection.

##### AMBLYPODIA ANITA.

*Amblypodia anita*, Hew. Cat. Lycæn. B. M. p. 14, pl. viii. figs. 90, 91 (1862).

Trusan (*Everett*); Labuan (*Low*).

#### IRAOTA, Moore.

##### IRAOTA ROCHANA.

*Amblypodia rochana*, Horsf. Cat. Lep. E. I. C. p. 108 (1829).

*Deudorix timoleon*, Druce, P. Z. S. 1873, p. 352 (nec Stoll).

Kina Balu (*Waterstr.*); Labuan (*Low* and *Mus. Staud.*).

A female sent by Dr. Staudinger measures  $2\frac{1}{2}$  inches. I also quite fail to see how Mr. Distant's *I. boswelliana* differs from this species.



## IRAOTA NILA. (Plate XXXIII. fig. 1 ♂.)

*Iraota nila*, Distant, Rhop. Malay. p. 462, pl. xlv. fig. 24 ♀ (1886); de Nicév. Butt. Ind. etc. iii. p. 217 (1890).

♂. Upperside very dark uniform purplish black; inner margin of fore wing pale brown. Both wings sparingly dusted between the nervules on the discs with bright green scales which change to blue in some lights. Thorax and abdomen black, covered with greenish hairs. Two tails of about equal length, tipped with white, one on the submedian nervure, the other on the first median nervule. Underside as male.

Kina Balu (*Waterstr.*).

I have received several females from Kina Balu, which agree well with Mr. Distant's figure of the underside, but the outer margins above are very narrowly black, and the male described above which is in Dr. Staudinger's collection. The male agrees in neuration with the male *Iraota*, and has four subcostal nervules like it, whilst the female has but three. The lower discoidal nervule in both sexes originates from the upper discoidal, and in Mr. Distant's figure is incorrectly drawn, as also are the antennæ. As has been pointed out by Mr. de Nicéville, the name *nila* has already been used for a species of this genus by Kollar; but as his name is a synonym of *I. timoleon*, Stoll, it may be used for Mr. Distant's species.

## SURENDRA, Moore.

## SURENDRA PALOWNA.

*Amblypodia palowna*, Staud. Iris, ii. p. 131 (1889).

*Amblypodia amisena*, Druce (nec Hew.), P. Z. S. 1873, p. 354.

Kina Balu (*Everett*); Borneo (*Low*).

I have compared these specimens with the type of Dr. Staudinger's *A. palowna* from the island of Palawan, and find that they are identical. *A. palowna* can be distinguished from *A. amisena*, Hew., by the hind wing being notched only, in both sexes—*A. amisena* possessing one tail in the male and two in the female. The underside of the hind wing in *A. amisena* is thickly sprinkled with green scales towards the anal angle, whilst in *A. palowna* these scales are generally entirely absent. I am inclined to think, however, that when a larger series of these butterflies can be examined, these characters will be found to be insufficient to distinguish the two species individually or from Horsfield's *A. vivarna* from Java.

Messrs. Godman and Salvin possess one female, obtained by Mr. Low, on which the purple gloss is entirely absent.

## ARHOPALA, Boisd.

All the species here included have, with the exception of the well-known *A. centaurus*, Fab., and *A. apidunus*, Cr., been carefully compared with the actual type specimens, and besides these

there are in Messrs. Godman and Salvin's and our own collection about a dozen species which I am unable to determine; but as Mr. G. T. Bethune-Baker is at present engaged on a monograph of the whole genus, I have thought it better to include only those species which I can identify with absolute certainty. Besides these unidentified species, most of which are probably undescribed, there are doubtless many new forms from Kina Balu. Mr. Herbert Druce recorded four species in his paper in P. Z. S. 1873, pp. 353, 354, viz. *A. adatha*, Hew., *A. amphimuta*, Feld., *A. hypomuta*, Hew., and *A. lycenaria*, Hew., which I do not include, as I find that the specimens, which in some cases are not labelled with the names, cannot be referred to these species.

#### ARHOPALA CENTAURUS.

*Papilio centaurus*, Fab. Syst. Ent. p. 520 (1775).

*Amblypodia nakula*, Druce, P. Z. S. 1873, p. 353.

*Narathura centaurus*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 269 (1887).

Sandakan (Pryer); Labuan (Low).

#### ARHOPALA AGNIS.

*Arhopala agnis*, Feld. Reise Nov., Lep. ii. p. 228 (1865).

*Amblypodia anarte*, Druce, P. Z. S. 1873, p. 353.

Labuan (Low).

There are two males in Messrs. Godman and Salvin's collection which are identical with Felder's type; also a female which was referred to *A. anarte* by Mr. Herbert Druce.

#### ARHOPALA AMPHEA.

*Arhopala amphæa*, Feld. Reise Novara, Lep. ii. p. 234, pl. xxix. fig. 19 (1865).

*Amblypodia abseus*, Druce, P. Z. S. 1873, p. 353.

Sandakan (Pryer); Labuan (Low).

Bornean specimens agree well with Philippine Island specimens, and if *A. amphæa* is considered distinct must stand under that name.

#### ARHOPALA ATOSIA?

*Amblypodia atosia*, Hew. Ill. Diurn. Lep., *Lyc.* p. 9, pl. ii. figs. 8, 9 (1863).

*Amblypodia atosia*, Druce, P. Z. S. 1873, p. 353.

Labuan (Low); Borneo (*Mus. Druce*, ex Rev. R. Murray's collection).

All the Bornean specimens before me are identical with Hewitson's type on both surfaces, but are without the tails, so that I place them under this name with considerable doubt. Mr. de Nicéville's figure of *A. atosia*, Hew. (Butt. Ind. etc. iii. frontispiece, fig. 138, 1890), is very little like Hewitson's type, as on the upperside it appears to be rich purple, while *A. atosia* is lilac-blue,

and on the underside is much less distinctly marked than his figure shows.

ARHOPALA AROA.

*Amblypodia aroa*, Hew. Ill. Diurn. Lep., *Lyc.* p. 13, pl. ii. fig. 13 (1863).

Trusan (*Everett*).

A single male in Messrs. Godman and Salvin's collection, which differs only from Hewitson's type from Sumatra by the bands on the underside being slightly wider, and by the metallic patch near the anal angle being composed of blue in place of green scales.

ARHOPALA PRYERI.

*Narathura pryeri*, Butl. P. Z. S. 1892, p. 121.

Sandakan (*Pryer*); Sarawak (*Everett*).

Mr. Bethune-Baker will probably tell us to which species this is most nearly allied if it should prove to be a distinct one. It is certainly not closely allied to *A. amphimuta*, Feld., as stated by Dr. Butler, as that species belongs to the tailless group and *N. pryeri* to the tailed, as an examination of the type proves.

ARHOPALA ALLATA.

*Amblypodia allata*, Stgr. Iris, ii. p. 125, pl. ii. fig. 1, ♀ (1889).

Labuan (*Low*).

Messrs. Godman and Salvin possess a male which differs only from Dr. Staudinger's type, ♂, by the dark brown borders on the upperside being rather narrower.

ARHOPALA ACHELOUS.

*Amblypodia achelous*, Hew. Cat. *Lyc.* B. M. p. 7, pl. v. figs. 47, 48 (1862); Druce, P. Z. S. 1873, p. 354.

Labuan (*Low*).

ARHOPALA ANUNDA.

*Amblypodia anunda*, Hew. Ill. Diurn. Lep. p. 14 a, pl. 111 a, fig. 32 (1869).

*Amblypodia anunda*, Druce, P. Z. S. 1873, p. 354.

Labuan (*Low*).

ARHOPALA ELOPURA.

*Arhopala elopura*, H. H. Druce, Ent. Mo. Mag. ser. 2, vol. v. p. 9 (1894).

Kina Balu (*Waterstr.*); Elopura (*Pryer*). Types Mus. Druce.

Taken by Mr. Pryer in March. Messrs. Godman and Salvin's collection also contains a male.

ARHOPALA APIDANUS.

*Papilio apidanus*, Cr. Pap. Ex. vol. ii. pl. cxxxvii. figs. F, G (1777).

*Amblypodia apidanus*, Druce, P. Z. S. 1873.

Labuan (*Low*); Lawas (*Everett*).

## ARHOPALA OLINDA.

*Amblypodia olinda*, Druce, P. Z. S. 1873, p. 354, pl. xxxiii. fig. 5, ♀.

*Amblypodia buxtoni*, Hew. Ill. Diurn. Lep., *Lyc.* Supp. p. 22, pl. viii. figs. 68, 69, ♀ (1878).

*Narathura buxtoni*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 269 (1887).

Sandakan (*Pryer*); Labuan (*Low*).

On comparing the type (a female) of *A. olinda* with that of *A. buxtoni*, I find that they cannot be separated, and as Hewitson's species was described some five years later than Mr. Herbert Druce's, *A. olinda* is the name by which the insect should be known. The figure given in the P. Z. S. is not a good one, as it shows an equally broad brown marginal border to both wings; this, however, is not so, as in the fore wing the apex is rather broadly brown and in the hind wing the blue area extends nearly to the outer margin. The type of *A. olinda* is now in Messrs. Godman and Salvin's collection.

## ARHOPALA CÆCA.

*Amblypodia cæca*, Hew. Ill. Diurn. Lep., *Lyc.* p. 14, pl. iv. fig. 28 (1863).

Sarawak (*Hew.*).

This species is known to me only by the type in the Hewitson collection.

## ARHOPALA AUREA.

*Amblypodia aurea*, Hew. Cat. *Lyc.* B. M. p. 8, pl. viii. figs. 87, 88 (1862); Druce, P. Z. S. 1873, p. 353.

Sarawak (*Hew.*); Labuan (*Low*).

## ARHOPALA FARQUHARI.

*Narathura farquhari*, Distant, Rhop. Malay. p. 264, pl. xxiii. fig. 3, ♂ (1885).

*Arhopala farquhari*, de Nicév. Butt. Ind. etc. iii. p. 264 (1890). S. E. Borneo.

I include this species here on the authority of Mr. Doherty, not having seen a specimen from Borneo. Messrs. Godman and Salvin possess examples from Malacca, Sumatra, and the Philippine Is.

## ARHOPALA HORSFIELDI.

*Amblypodia horsfieldi*, Pagenstr. Beit. Lep. Faun. Malay. Arch. vi. p. 15 (1890).

*Arhopala basiviridis*, de Nicév. J. B. N. H. Soc. 1891, p. 373, pl. G. fig. 22, ♂.

Borneo.

Mr. de Nicéville records this insect from Borneo, whence it was also obtained by Mr. Doherty. Dr. Pagenstecher describes it from Eastern Java.

## ARHOPALA ANNIELLA.

*Amblypodia anniella*, Hew. Cat. Lyc. B. M. p. 10, pl. viii. figs. 83, 84 (1862); Druce, P. Z. S. 1873, p. 353.

Kina Balu (*Waterstr.*); Labuan (*Low*).

Bornean specimens agree well with Hewitson's type from Singapore.

## ARHOPALA AGESIAS.

*Amblypodia agesias*, Hew. Cat. Lyc. B. M. p. 11, pl. vi. figs. 55, 56, ♀ (1862).

Sandakan (*Pryer*).

Several specimens agreeing well with the type.

## Var. KINABALA, nov.

Differs from the type by being generally larger and with the spots on the underside larger and darker and with an additional spot on the costa of the fore wing.

Kina Balu (*Waterstr.*); Labuan (*Low*).

This may prove to be a distinct species, but for the present I do not think it advisable to treat it as such.

## ARHOPALA SIMILIS, sp. n.

*Amblypodia agesias*, var. *a*, Hew.

♂ ♀. Allied to *A. agesias*, Hew. Upperside much the same. Underside differs by the fore wing being entirely without the discal band of spots which is placed beyond the end of the cell.

Sandakan (*Pryer*). Mus. G. & S. and Druce.

Mr. de Nicéville has recorded this species from Selangor in the Malay Peninsula. It is probably quite distinct from *A. agesias* and has been received in about equal numbers. Hewitson describes *A. agesias* as possessing four spots in the discal band of the fore wing, but counting from the commencement on the costa there are seven or eight, the lowest sometimes being obsolete.

## ARHOPALA MYRTALE.

*Amblypodia myrtale*, Staud. Iris, i. p. 126, pl. i. fig. 16, ♂ (1889).

Sandakan and Elopura (*Pryer*); Labuan (*Low*).

I have before me several specimens which agree well with Dr. Standinger's type (and figure) from Palawan.

## ARHOPALA AMPHIMUTA.

*Amblypodia amphimuta*, Feld. Wien. ent. Monat. vol. iv. p. 396 (1860).

*Narathura amphimuta*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 269 (1887).

Sandakan (*Pryer*).

Included here on the authority of Messrs. Distant and Pryer, as I have not seen a Bornean specimen which agrees exactly with Felder's type.

## ARHOPALA ANTIMUTA.

*Arhopala antimuta*, Feld. Reise Nov., Lep. vol. ii. p. 233 (1865).

*Arhopala davisoni*, de Nicév. Butt. Ind. etc. iii. p. 280, frontispiece, fig. 135, ♂ (1890).

Sandakan and Elopura (*Pryer*); Labuan (*Low*).

I have been able to examine the type of *A. antimuta* in the Felder collection, and find that *A. davisoni* is identical with it. It is entirely without the large round patch of scales described by Mr. de Nicéville (Butt. Ind. etc. iii. p. 277), but not by Felder, as belonging to it. Mr. de Nicéville appears to have founded the species which I have doubtfully referred to *A. atosia*, Hew., with *A. antimuta*, but an examination of Felder's type proves that this is incorrect. The blue colour of the type and only specimen in the Felder collection is quite dark, much as in *A. arca*, but darker, whilst the specimens he probably refers to are quite a different colour. Mr. H. J. Elwes records it from Borneo (P. Z. S. 1892, p. 633)<sup>1</sup>.

## ARHOPALA ALACONIA.

*Amblypodia alaconia*, Hew. Ill. Diurn. Lep., *Lyc.* p. 14, pl. iii c. figs. 52, 53 (1869); Druce, P. Z. S. 1873, p. 353.

Labuan (*Low*).

Below will be found described what I believe to be a new species of the genus *Mahathala*, Moore<sup>2</sup>.

## ARHOPALA EPIMUTA.

*Amblypodia epimuta*, Moore, Cat. Lep. E. I. C. p. 42 (1857).

Borneo (*Low*).

<sup>1</sup> Messrs. Godman and Salvin's collection contains a single specimen of *A. inornata*, Feld., from the Philippine Is., which I have compared with Felder's type. The figure is a fairly good one, and anyone possessing the species should have no difficulty in recognizing it on account of its unusual shape. The hind wing below is entirely without any metallic scales at the anal angle. It is apparently a rare species, as the specimen here mentioned is recorded for the first time since it was described.

<sup>2</sup> MAHATHALA GONE, sp. n.

Allied to *M. ameria*, Hew. Upperside dark purple-blue with much broader black margins; cilia, tails, and anal fold of hind wing buff-colour. Underside—fore wing dull greyish brown with pale bars and markings arranged as in *M. ameria*, but with the ultra-median band wider, straighter, and not angled on the costa as in that species: hind wing uniform dull yellowish stone-colour, sprinkled with minute black dots, generally largest on the nervules; two dull black irregular spots in line near the base just below the median nervure, the largest at the origin of first median nervule. A few patches of pale reddish scales, thickest near the base. Head, thorax, and abdomen black above, yellowish beneath. Antennæ black.

Expanse  $1\frac{7}{10}$  inch.

*Hab.* Mongolia. Type Mus. G. & S.

The type specimen, which was formerly in Mr. Druce's collection, is unique, and differs so much from all specimens I have seen of *M. ameria* that I feel sure it is another species. I cannot determine to which sex the specimen described belongs.

Mr. Moore's type is now in the British Museum Collection. Mr. Bethune-Baker will doubtless decide whether the insects from India afterwards described by Hewitson in the British Museum Catalogue as *A. epimuta* are identical with the type.

#### CURETIS, Hübn.

Mr. de Nicéville has expressed the opinion that there are but two species of this genus occurring within Indian limits (Butt. Ind. etc. vol. iii. p. 285), and later (p. 291) that *C. æsopus* is a distinct connecting link between these two. In arranging the Bornean species I have found the same difficulty in pairing the females as he mentions with regard to those from India. So far as I can ascertain, the ochreous-coloured female is the only form that is found in Borneo, as I have not come across a single white one.

#### CURETIS TAGALICA.

*Anops tagalica*, Feld. Reise Novara, Lep. ii. p. 221, pl. xxviii. figs. 19, 20 (1865).

*Curetis tagalica*, Druce, P. Z. S. 1873, p. 353.

Labuan (*Low*).

*C. tagalica* is scarcely distinguishable from *C. phædrus*, Fab., on the upperside, but on the underside Bornean specimens are usually very strongly suffused with blackish brown.

#### CURETIS NESOPHILA.

*Phædra nesophila*, Feld. Wien. ent. Mon. vi. p. 289 (1862).

*Curetis barsine*, Druce, P. Z. S. 1873, p. 353 (nec Feld.).

Kina Balu (*Waterstr.*); Sarawak (*Platen*); Labuan (*Low*, *Waterstr.*, and *Wahnes*).

In *C. nesophila* the cupreous red does not extend above the subcostal nervure in the fore wing except just at the base. Mr. Herbert Druce referred these specimens to *C. barsine*, Feld., from Amboina, which has a female with white spots on the discs; but as there appears to be no evidence of any white females occurring in Borneo, I think it better to place them under *P. nesophila*.

#### CURETIS MINIMA.

*Curetis minima*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 265 (1887).

Sandakan (*Pryer*).

I have not seen this species, which is described as being near to *C. insularis*, Horsf., from Java.

#### CURETIS ÆSOPUS.

*Papilio æsopus*, Fab. Sp. Ins. vol. ii. p. 125 (1781).

Kina Balu (*Waterstr.*); Labuan (*Waterstr.* and *Wahnes*); S.E. Borneo, near Banjarmasin (*Wahnes*).

The specimens before me vary as to the extent of cupreous red above the subcostal nervure in the hind wing. In some examples the outer half only of the costal margin is narrowly brown, in others the whole margin is broadly brown from the base. Between these two forms are all intermediates.

#### CURETIS MALAYICA.

*Amops malayica*, Feld. Reise Novara, Lep. ii. p. 221, pl. xxviii. fig. 18 (1865).

Kina Balu (*Waterstr.*); S.E. Borneo, near Banjarmasin (*Wahnes*).

A female from Kina Balu has the costal margin of the hind wing very pale, almost white.

#### ILERDA, Doubl.

##### ILERDA KIANA.

*Sithon kiana*, Grose Smith, Ann. & Mag. Nat. Hist. ser. 6. vol. iii. p. 317 (1889); Whitehead, Kina Balu, p. 118, pl. xx. figs. 7, 8 (1893).

Kina Balu (*Everett, Whitehead, Waterstradt*).

The apparent likeness of the underside of this Butterfly to species of the genus *Ilerda* led me to carefully examine its neuration, and on bleaching specimens of both sexes I find that the neuration is exactly the same as in *I. epicles*, Godt. It agrees also in the form of the antennæ and in the absence of any secondary sexual characters; the only difference that I can detect is that the terminal joint of the palpus is slightly longer than in *I. epicles*. It has been received in some numbers from Kina Balu, and is remarkably different from any other species of the genus. Both sexes are much alike, the female having a rather less extensive and greyer blue anal patch with larger black spots. Mr. Grose Smith has kindly shown me his type.

#### DACALANA, Moore.

##### DACALANA VIDURA.

*Amblypodia vidura*, Horsf. Cat. Lep. E. I. C. p. 113 (1829)<sup>1</sup>.

*Iolaus vidura*, Druce, P. Z. S. 1873, p. 351.

*Dacalana vidura*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 268 (1887).

Sandakan; Elopura (*Pryer*); Trusan (*Everett*); Labuan (*Low*); S.E. Borneo, near Banjarmasin (*Wahnes*).

The white band crossing the wings on the underside varies somewhat in width in Bornean specimens as it does in Javan.

<sup>1</sup> Messrs. Godman and Salvin possess a male *Dacalana burmana*, Moore, collected in Burmah by Hume, which agrees in venation exactly with *D. vidura*. Indeed it is very doubtful if *D. burmana* can claim specific rank from that species; the upperside is certainly a darker blue colour, but the characters given for the underside are valueless. Mr. H. J. Elwes gives it as a synonym in his paper in the P. Z. S. 1892, on Butterflies collected by Mr. Doherty in the Naga and Karen hills and Perak.



## ARRHENOTHRIX, de Nicév.

It is with much pleasure that I am able to add another species to this interesting genus; I have carefully examined the specimen and find that it agrees exactly in venation with *A. penicilligera*, de Nicév.,—thus proving that *Dacalana* and *Arrhenothrix* are found flying together.

ARRHENOTHRIX LOWII, sp. n. (Plate XXXIII. fig. 2 ♂.)

♂. Upperside much like *A. penicilligera*, but of a much duller and more purple shade of blue; the apex and outer margin of fore wing considerably less broadly black. The outer margins of both wings, especially that of the hind wing, much more convex than in *A. penicilligera*. The whitish tuft of hairs covering the brown patch on the fore wing as in *A. penicilligera*. Underside differs from that species in the more russet-brown colour and by the complete absence of the conspicuous white band which crosses both wings. The lobe also is smaller and the tails shorter and more slender, especially that one on the submedian nervure, which is scarcely half the length of the corresponding tail on *A. penicilligera*.

Expanse  $1\frac{1}{2}$  inch.

Labuan (*Low*).

The type of this species, and the only specimen known to me, is in Messrs. Godman and Salvin's collection. A glance at the underside will at once distinguish this from its congener.

## PRATAPA, Moore.

PRATAPA LUCIDUS, sp. n. (Plate XXXIII. fig. 3 ♂.)

*Iolais cippus*, Druce, P. Z. S. 1873, p. 351.

♂. Closely allied to *P. cippus*, Fab. Differs on the underside by the entire absence of the linear band, excepting over the orange patch at the anal angle of the hind wing, where it is present but very narrow. The black spots are smaller, and the orange patch is darker and not divided as in *P. cippus*.

Expanse as *P. cippus*.

Labuan (*Low* and *Waterstr.*). Type Mus. G. & S.

The specimens before me show no variation. Messrs. Godman and Salvin's collection also contains this species from Sumatra.

PRATAPA SANNIO, sp. n. (Plate XXXIII. fig. 15 ♂.)

♂. Allied to *P. anysis*, Hew. Upperside much the same, but with the shining surface on the hind wing extending further down towards the apex. Underside differs from *P. anysis* by the band which crosses both wings being narrow and more sordid white, by the shining surface along the inner margin of the fore wing being blacker, and by the broken black line in the hind wing being more curved outwardly towards the apex and more inclined to be semi-

circular over the orange patch, which is rather less extensive. The spot on the lobe, which in *P. anysis* is completely black, is faintly crowned with orange. The shape of the hind wing is entirely different, it being less produced at the costal and anal extremities and the outer margin much more rounded. Tuft of hairs on inner margin of fore wing dark brown.

Expanse  $1\frac{3}{5}$  inch.

Sandakan (*Pryer*). Type Mus. G. & S.

Allied to *P. anysis*, Hew., and *P. cremera*, de Nicév., but has a much narrower band below, besides other differences pointed out in the description <sup>1</sup>.

PRATAPA DEVANA, sp. n. (Plate XXXIII. fig. 4 ♂, 5 ♀.)

*Iolaus devana*, Stand. MS.

Allied to *P. deva*, Moore.

♂. Upperside very pale shining blue, palest on the disc of the fore wing; apical half and outer margin of fore wing and costal margin and apex of hind wing dark greyish brown; an outer-marginal row of more or less distinct dark brown spots on the hind wing, and a black anteciliary line; the shining patch is large and prominent, spreading all over the cell, and centred by a deep black patch of differently placed scales resting on the subcostal nervure; an orange spot in the lobe; anal fold greyish white. Underside differs from *P. deva* by being of a more pinkish tinge, with the linear band which crosses both wings more distinct, less broken, and placed closer to the outer margins; the orange patch surrounding the upper black spot on the margin much more extensive. The tuft of hairs on inner margin of fore wing jet-black. Abdomen and thorax blue above, whitish below.

♀. Upperside pale lavender-blue, paler on the discs of the fore wing, more extensive than in the male; apex and outer margin of fore wing and apex of hind wing greyish brown; a distinct black streak almost closing the cell of the fore wing, and an outer-marginal row of black spots on the hind wing. Underside as male, with a faint mark closing the cell of the fore wing, caused by the black mark on the upperside.

Expanse, ♂  $1\frac{3}{5}$ , ♀  $1\frac{1}{2}$  inch.

Kina Balu and Labuan (*Waterstr.*). Types Mus. Staud.

*P. devana* is by far the palest coloured species in the genus, being paler than the female *P. cotys*, Hew. It is a very distinct species, and the black mark closing the cell of the fore wing in the female is quite unusual.

<sup>1</sup> Mr. H. J. Elwes has lately remarked (P. Z. S. 1892, p. 637) that the tuft of hairs on the margin below is absent in *C. cotys*, whilst Mr. de Nicéville (Butt. Ind. etc. vol. iii. p. 343) states that the tuft of hairs in *C. anysis* is black instead of dark brown in *C. cotys*. Specimens of *C. cotys* that I have examined from Darjeeling certainly have the usual tuft, while in a specimen of *C. anysis* from the Philippines in Messrs. Godman and Salvin's collection the tuft is dark brown as in *C. cotys*.

PRATAPA CALCULIS, sp. n. (Plate XXXIII. figs. 6 ♂, 7 ♀.)

♂. Upperside brilliant deep blue, colour of *P. deva*, Moore. Fore wing—apex from beyond the cell black, gradually narrowing towards outer angle; a short black line partially closing the cell from the subcostal nervule. Hind wing—costal margin and apex rather narrowly black; the brown shining patch more extensive than in *P. deva*, reaching below the median nervule, with its outer edge straight and clearly defined, and with the darker central patch almost obsolete and placed above the subcostal nervule; anal fold greyish brown; a black anteciliary line from apex to anal angle; cilia black, whitish near the tails, which are black bordered and tipped with white; lobe orange, with a few metallic scales. Underside much like that of *Tajuria isæus*, Hew., but the ground-colour darker and the common linear band placed closer to the outer margins; a broad orange streak on the costa of fore wing close to the base. The black spots and orange patch at anal angle of hind wing are just as in *T. isæus*; tuft of hairs on inner margin cream-colour.

♀. Upperside pale lavender-blue with paler brown margins; the nervules dusted with brownish. Underside as male, but orange streak on costa of fore wing less conspicuous.

Expanse, ♂ ♀,  $1\frac{2}{5}$  inch.

Kina Balu (*Waterstr.*).

This is a very distinct species, not closely allied to any with which I am acquainted. The types are in Dr. Staudinger's collection.

#### APHNÆUS, Hübn.

##### APHNÆUS SYAMA.

*Amblypodia syama*, Horsf. Cat. Lep. E. I. C. p. 107 (1829).

The ground-colour of the underside of all the Bornean specimens I have examined is darker than the typical Javan form. Specimens having the bands red occur, as also those with the bands black.

Labuan (*Low and Waterstr.*).

##### Ab. FRIGIDUS.

*Aphnæus frigidus*, Druce, P. Z. S. 1873, p. 350, pl. xxxii. fig. 10.

I feel certain that the species described as above cannot hold good, but that it is simply an aberration of the well-known *A. syama*. On the underside of the left fore wing the 3rd band (counting from the base) is represented by a spot on the costa, whilst on the right fore wing the 3rd and 4th bands are both represented in a like manner. Messrs. Godman and Salvin possess a specimen in which the 3rd and 4th bands have entirely disappeared; also another, in which the 3rd band is well developed and has attached to it the lower portion of the 4th band, the upper part of which is wanting. The hind wing of typical *A. frigidus* also appears quite different from *A. syama*, the 3rd band being replaced by a

large spot on the costa; but one of the specimens referred to above has this spot much smaller, whilst the other has the spot and below it the band which is bent inwards just under the spot and becomes partially amalgamated with the 2nd band.

It is curious that *A. syama* should show such great variation in Borneo. In Continental India it varies much in the ground-colour, but I have seen no specimens at all approaching these, neither does Mr. de Nicéville mention any. Mr. Herbert Druce did not give *A. syama* in his list; probably they were received after it was published.

#### APHNÆUS LOHITA.

*Amblypodia lohita*, Horsf. Cat. Lep. E. I. C. p. 106 (1829).

Kina Balu and Labuan (*Waterstr.*).

*A. lohita* does not appear to have been obtained by Low, but Dr. Staudinger has received it in considerable numbers—one large female from Kina Balu measuring  $1\frac{9}{10}$  inch.

#### APHNÆUS VIXINGA.

*Aphnæus vixinga*, Hew. Ent. Mo. Mag. xii. p. 39 (1875).

Borneo (*Low*).

This is a large and distinct species known to me only by the type. The ground-colour of the underside is very dark, and the silver spots are quite different from the other two Bornean representatives of the genus.

#### TAJURIA, Moore.

All the species here included in this genus have three subcostal nervules in the fore wing and are without any secondary sexual characters.

#### TAJURIA JALINDRA.

*Amblypodia jalindra*, Horsf. Cat. Lep. E. I. C. p. 109 (1829).

*Sithon jalindra*, Druce, P. Z. S. 1873, p. 352.

Labuan (*Low and Waterstr.*).

#### TAJURIA MACULATUS.

*Iolaus maculatus*, Hew. Ill. Diurn. Lep., *Lyc.* p. 47, pl. xxi. figs. 29, 30 (1865).

Kina Balu (*Waterstr.*).

*T. maculatus* is, I believe, recorded here for the first time out of India, where it occurs in Sikkim and Assam.

#### TAJURIA LONGINUS.

*Hesperia longinus*, Fab. Ent. Syst. Suppl. vol. v. p. 430 (1798).

*Hab.* Sarawak (*Mus. Druce*).

We possess a single male specimen, which is my only authority for including this well-known species.

## TAJURIA DOMINUS, sp. n. (Plate XXXIII. fig. 12 ♂.)

♂. Upperside brilliant shining cerulean blue, much like *P. cleobis*, Godt., but more opalescent; fore wing with the apex broadly black and with a quadrate black "sexual mark" occupying rather more than the outer half of the cell; hind wing—costal margin greyish, darker towards the apex, which is black. Underside differs from *P. cleobis* by the ground-colour being darker, the linear band being placed closer in, the black spots at the anal angle being much larger, and the yellow being much more extensive and confluent. The patch between the spots is dusted with metallic scales.

Expanse  $1\frac{2}{5}$  inch.

Kina Balu (*Waterstr.*).

*T. dominus* is allied to *T. melastigma*<sup>1</sup>, de Nicév., but in that species the "sexual mark" is placed beyond the cell. It is also much like *T. cleoboides*<sup>2</sup>, Elwes, which is described as possessing only two subcostal nervules to the fore wing, whilst *T. dominus* has three. Messrs. Godman and Salvin possess a specimen, which I believe to be referable to *T. dominus*, which differs only from the type on the underside by the black spots being smaller and the yellow less extensive; it is labelled "Burmah."

## TAJURIA MANTRA.

*Myrina mantra*, Feld. Reise Novara, Lep. vol. ii. p. 238, pl. xxx. fig. 14 (1865).

*Iolaus mantra*, Druce, P. Z. S. 1873, p. 351.

*Iolaus cyrinus*, Staud. MS.

Kina Balu (*Waterstr.*); Labuan (*Low*).

*T. mantra* is a common insect in Borneo.

## TAJURIA CYRUS, sp. n. (Plate XXXIII. figs. 10 ♂, 11 ♀.)

*Iolaus cyrus*, Staud. MS.

♂. Allied to *T. mantra*, Felder, but larger, and the outer margin of fore wing convex. Upperside blue, slightly paler, without the opalescence, and more extensive in both wings; a black spot in the lobe crowned with orange. Underside differs from that of *T. mantra* ♂ by the ground being much paler, by the linear band of the fore wing being narrower and indistinct, by the inner margin of the fore wing being broadly white for nearly its whole length, and by the orange patches at the anal angle of the hind wing being of a deeper shade.

♀. Differs from the male by the blue being of a slightly paler shade and considerably more extensive in the fore wing; the black

<sup>1</sup> *T. melastigma*, de Nicév., P. Z. S. 1887, pl. xl. fig. 1.

<sup>2</sup> *T. cleoboides*, Elwes, P. Z. S. 1892, p. 637, pl. xlv. figs. 4, 5.

*T. melastigma* is described as having the "sexual mark" shining black, but in the figure it is shown as pale brown, much the colour of the underside. *T. cleoboides* is described as having "a large round velvet patch free from blue scales in the cell of the fore wing"—presumably a black patch; but this does not appear in the figure of the insect.

spot in the lobe and the orange crowning it are both larger. Underside as male, but inner margin of fore wing not so distinctly white and the linear band of fore wing more prominent.

Expanse, ♂ ♀, 2 inches.

Kina Balu (*Waterstr.*).

This is a fine and, I believe, quite distinct species, which should be easily recognized.

TAJURIA TUSSIS, sp. n. (Plate XXXIII. figs. 8 ♂, 9 ♀.)

♂. Pale blue, much the colour of *T. isæus*, Hew. Differing from that species by the apical half of the fore wing being black, the black apex extending from just beyond the cell to the outer angle. The underside differs from *T. isæus* by the common linear band being placed nearer to the margins, by having a pale orange streak at the base of the costa on the fore wing, and by the orange at the anal angle being darker.

♀. Upperside dull violaceous blue, more extensive in the fore wing than in male; hind wing with the nervules brown and with a marginal row of ill-defined brown spots. Underside as male, but the costal streak but slightly ochreous and barely discernible, whilst the linear bands appear to be further in.

Expanse, ♂  $1\frac{3}{40}$  inch, ♀  $1\frac{3}{5}$  inch.

Labuan (*Waterstr.*).

The types of this species are the only specimens I have seen and belong to Dr. Staudinger. I do not feel quite certain that the female here described belongs to the male, as the linear band is placed somewhat further in—it is not, however, anything like so far in as in *T. isæus*.

TAJURIA ISÆUS.

*Iolus isæus*, Hew. Ill. Diurn. Lep., *Lyc.* p. 44, pl. xix. figs. 13, 14 (1865).

Sarawak (*Hew.*).

Hewitson is my only authority for including this species.

Mr. H. J. Elwes has lately pointed out<sup>1</sup> that *T. relata*, Distant, is conspecific with *T. isæus*, and after an examination of the type ♂ kindly sent me by Dr. Staudinger, I am able to confirm this statement—it is identical with Hewitson's species.

TAJURIA CATO, sp. n. (Plate XXXIII. figs. 13 ♂, 14 ♀.)

♂. Upperside bright blue, brighter and darker than in *T. mantra* and somewhat differently placed—in the fore wing there being less in the cell and more in the first median interspace, and in the hind wing more extensive; apex and outer margin black, with a large inconspicuous black patch of differently placed scales occupying more than the upper half of the cell in the fore wing. Anal fold dark greyish; lobe with a black spot dusted with a few metallic scales, but no orange. Tails black, tipped with white, the lower with bluish cilia. Underside rich dark reddish brown, with

<sup>1</sup> P. Z. S. 1892, p. 637.

a common, straight, dark red linear band outwardly edged with white, angled towards anal margin of hind wing; inner margin of fore wing paler greyish brown. The cells of both wings are closed by faint marks caused apparently by appressions. Hind wing—a large black spot crowned by metallic-blue scales occupying the whole of the lobe, above that from the submedian nervure to the third median nervule a large greyish patch thickly dusted with black scales, and resting on this between the first and second median nervules a rather small black spot crowned with dark red. Thorax and abdomen bluish above, dark buff below. Head brown; antennæ black, ringed with white. All the legs black, spotted with pale buff. Cilia on both surfaces cupreous brown, except at anal angle, where it is greyish.

♀. Upperside paler and more lavender-blue; the blue more extensive in the fore wing and reaching beyond the end of the cell, at which there is a white spot; the black spot in the lobe is faintly crowned with orange scales. Underside as male but paler.

Expanse, ♂ ♀,  $1\frac{1}{2}$  inch.

Kina Balu (*Waterstr.*).

This is a beautiful species, not closely allied to any other. The distinctly spotted legs are quite unusual in the *mantra* group. The types belong to Dr. Staudinger's collection.

#### TAJURIA TRAVANA.

*Myrina travana*, Hew. Ill. Diurn. Lep., *Lyc.* p. 38, pl. xvii. fig. 59, 60 (1865).

*Sithon travana*, Druce, P. Z. S. 1873, p. 352.

Kina Balu (*Waterstr.*); Sandakan (*Pryer*); Labuan (*Low*).

Mr. de Nicéville (*Butt. India*, iii. p. 38, 1890) is of opinion that this species should be treated as a local race only of *T. jangala*, Horsf.

Two females of *T. jangala*, Horsf., in Messrs. Godman and Salvin's collection are entirely brown on the upperside.

#### TAJURIA DONATANA, de Nicév.

*Tajuria donatana*, de Nicév. J. A. S. B. vol. lvii. p. 287, pl. xiv. fig. 5 (1888); *Butt. Ind. etc.* iii. p. 382, pl. xxv. fig. 154, ♂ (1890).

Labuan (*Low*).

Messrs. Godman and Salvin's collection contains a single male specimen of this species, which differs only from the figure (no. 154, *Butt. India*, iii.) by the black spot in first median interspace on the underside of hind wing being somewhat larger.

#### PURLISA, Distant.

##### PURLISA GIGANTEUS.

*Iolaus (Purlisa) giganteus*, Distant, *Ent. Mo. Mag.* vol. xvii. p. 245 (1881).

*Purlisa gigantea*, Distant, *Rhop. Malay.* p. 250, pl. xxi. fig. 28 (1885).

Sarawak (*Mus. Druce*).

We possess a fine female specimen which agrees well with Mr. Distant's figure and expands no less than  $2\frac{1}{2}$  inches, whilst the tail on the submedian nervure measures  $\frac{3}{5}$  inch and is much broader than in any of the species of *Tajuria*, the nervure being distinctly visible along it almost to the tip; so that it is more probably allied to *Cheritra*, Moore, where it was placed by Mr. Distant, than to *Tajuria* as suggested by Mr. de Nicéville (*Butt. India*, iii. pp. 385, 386, 1890).

It must be a rare insect wherever it occurs, as being so conspicuous it would have been more frequently captured.

The only other recorded locality for it is Penang.

## SUASA, de Nicév.

## SUASA LIRIS.

*Sithon liris*, Staud. *Iris*, ii. p. 110, pl. i. fig. 10, ♂ (1889).

Kina Balu (*Waterstr.*).

The Bornean specimens have the apex and outer margin of the fore wing below a much duller shade of yellow than the type from Palawan, otherwise they agree well. The female, like that of *S. lises*, Hew., is without the black subbasal spot on the hind wing.

## THAMALA, Moore.

## THAMALA MARCIANA.

*Myrina marciانا*, Hew. *Ill. Diurn. Lep., Lyc.* p. 34, pl. xvi. fig. 44 ♂, pl. xii. figs. 12, 13 ♀ (1863).

*Thamala marciانا*, de Nicév. *Butt. Ind. etc.* vol. iii. p. 388 (1890).

Sarawak (*Hew.*); S.E. Borneo (*Doherty, vide de Nicév.*).

## HYPOLYCÆNA, Feld.

## HYPOLYCÆNA ERYLUS.

*Polyommatus erylus*, Godt. *Enc. Méth.* vol. ix. p. 633 (1823).

*Hypolycæna erylus*, Druce, *P. Z. S.* 1873, p. 351.

Trusan, N. Borneo (*Everett*); Labuan (*Low and Waterstr.*).

Bornean specimens of this species usually have the apices and outer margins of the wings below thickly dusted with russet-brown.

## HYPOLYCÆNA THECLOIDES.

*Myrina thecloides*, Feld. *Wien. ent. Monatsch.* vol. iv. p. 395 (1860).

*Hypolycæna thecloides*, Druce, *P. Z. S.* 1873, p. 351.

Labuan (*Low and Waterstr.*).

Bornean specimens before me differ from Burmese by having slightly more yellow on the upperside of hind wing.



## HYPOLYCÆNA SKAPANÆ, sp. n. (Plate XXXIII. figs. 16 ♂, 17 ♀.)

♂. Upperside dull brownish purple; apex of fore wing and costal margin of hind wing rather broadly brown; outer margin of fore wing narrowly brown. Anal fold greyish brown; a black spot on the lobe outwardly bordered with white. Cilia brown except in anal region, where it is white. Tails black, bordered with white. Underside pearly grey, coloured and marked much like *Z. etolus*, Fab., but without the black spot on the costal margin of the hind wing and with the band of the fore wing straighter, narrower, and more distinctly outer-edged with whitish, whilst on the hind wing the band, which in *Z. etolus* becomes linear and black towards the anal margin, is in this species yellow, of about equal width, and narrowly edged on both sides with black. The large black spot on the outer margin of hind wing between the first and second median nervules is bordered with orange on its inner and lower edges.

♀. Upperside uniform blackish; anal angular area rather broadly white, containing a series of four marginal black spots, alternately large and small, the first, in the lobe, being large. Underside as male, but brighter.

A tuft of the cilia in both sexes is considerably elongated at the extreme anal angle, thus giving the insect the appearance of having a third, but very short tail.

Expanse, ♂  $1\frac{1}{5}$ , ♀  $1\frac{1}{10}$  inch.

Kina Balu (*Waterstr.*). Types Mus. Staud.

I have compared this species to *Z. etolus* on the underside, but it is perhaps more like *H. thecloides* on that surface, but very different above. It is much smaller than the average *H. erylus*. It is also not unlike the *Chliaria merguia* as figured by Mr. Doherty<sup>1</sup>, but on the upperside the blue is much darker and not distinctly defined in the fore wing, and on the underside the band of the fore wing is straighter and the black spot between the median nervules is larger and also edged with orange; this is not shown in Mr. Doherty's figure, although he describes it as being present.

## HYPOLYCÆNA PHEMIS, sp. n. (Plate XXXIII. fig. 18 ♂.)

♂. Upperside rather dull slaty blue, but in some lights rich light purple-blue, much the colour of the darker blue on *Chliaria kina*, Hew., darkest in the fore wing. Costal apex and outer margin of fore wing and costal margin of hind wing blackish. Anal fold greyish white. A black spot in the lobe and two indistinctly defined marginal spots above it. Tails black with white borders; cilia as usual. Underside differs from *Z. etolus*, Fabr., only by the yellow apices being less extensive and much browner, by the black spot on the costa of the hind wing being replaced by a minute yellowish spot, by the double markings closing the cells being very inconspicuous, and by the band on the hind wing continuing wide where it is angled and broken towards the

<sup>1</sup> *Chliaria merguia*, Doherty, J. A. S. B. lviii. p. 427, pl. xxiii, fig. 2 (1889).

anal margin, not becoming linear as in *Z. etolus*. There are no metallic scales at the anal angle.

♀. Upperside much like that sex of *H. skapane*, mihi, with the white area larger. Underside as male. The male has a small blackish, inconspicuous, "sexual mark" on the fore wing, placed on the median nervules at their origin, whilst the hind wings of both sexes appear to be more produced anally than either of the other species of the genus.

Expanse, ♂ ♀,  $1\frac{1}{5}$  inch.

Kina Balu (*Waterstr.*). Types Mus. Staud.

The thorax and abdomen in the male, when the insect is held at an angle, appear even more brilliant than the wings. *H. phemis* is not unlike the West-African *H. hatita*<sup>1</sup>, Hew., on the upperside, but the tails are shorter.

#### CHLIARIA, Moore.

CHLIARIA MIMIMA, sp. n. (Plate XXXIV. fig. 1 ♂.)

♂ ♀. Allied to *C. othona*, Hew. Upperside differs from that species by the blue being of a paler and greyer shade and reduced to a patch below the median nervure in the fore wing. The underside differs from that of *C. othona* by the costa, apex, and outer margin of the fore wing being suffused with orange, by the discal bands in both wings being straighter, less broken, and of equal width their whole length. The black spot on costa of the fore wing and also the two on the costa of the hind wing are present but smaller.

Expanse, ♂ 1, ♀  $1\frac{1}{5}$  inch.

Kina Balu and Labuan (*Waterstr.*).

Distinguished at once by the different underside. The types are in Dr. Staudinger's collection. We also possess this species from N.E. Sumatra, but on the upperside the blue extends over the cell in the fore wing.

#### ZELTUS, de Nicév.

ZELTUS ETOLUS.

*Papilio etolus*, Fab. Mant. Ins. ii. p. 66 (1787).

*Hypolycaena etolus*, Druce, P. Z. S. 1873, p. 351.

Kina Balu (*Waterstr.*); Labuan (*Low*).

In all the specimens I have seen the apices of the wings below are much suffused with rich reddish brown. It is a common insect at Labuan.

#### PSEUDOMYRINA, gen. nov.

Allied to *Tajuria*, Moore. Fore wing more arched; the apex more rounded, and the inner margin distinctly convex. Venation much the same, but the cell of the fore wing distinctly shorter and broader. Hind wing with a large oval glandular patch near the

<sup>1</sup> *H. hatita*, Hew. Ill. Diurn. Lep., *Lyc.* p. 51, pl. xxiii. figs. 21-24 (1865).

base, partly resting on the subcostal nervure and extending upwards to the costal nervure, and lying over that is a tuft of long hairs, which are attached to the membrane of the wing below the glandular patch and the subcostal nervure.

The female possesses the same number of subcostal nervules as the male.

The tail on the submedian nervure is rather long and broad, whilst that on the first median nervule is short and thread-like.

Type, *Myrina martina*, Hew.

This is I believe the first genus described amongst the *Lycenidæ* in which the male possesses both the glandular patch and the tuft of hairs on the hind wing, and these characters serve at once to distinguish it from all others.

Hewitson in describing his *Myrina martina* noted its peculiarities, but no writer has since referred to them. I have compared it with *Tajuria*, but probably it is more nearly allied to *Neocheritra*, Distant, which differs by possessing an additional subcostal nervule in the fore wing (in the male) and a tuft of hairs on fore wing below.

In pattern and coloration *Neocheritra* and *Pseudomyrina* are much alike.

#### PSEUDOMYRINA MARTINA.

*Myrina martina*, Hew. Ill. Diurn. Lep., *Lyc.* Suppl. p. 3, t. 2. figs. 70, 71 (1869).

*Sithon martina*, Druce, P. Z. S. 1873, p. 351.

♀. Upperside brown, with white markings at the anal angle. Much like that sex of *Neocheritra theodora* (see p. 608), but with the tails considerably shorter. Underside as male.

Kina Balu (*Waterstr.*); Labuan (*Low and Waterstr.*).

On the underside this species closely resembles *Neocheritra amrita*, Feld., and *N. theodora*, mihi, but can be distinguished by the brown bar over the spots at the anal angle becoming broader and straighter as it reaches the inner margin, which is not so in the species mentioned<sup>1</sup>.

#### VIRGARINA, gen. nov.

Allied to *Pseudomyrina*. With three branches to the subcostal nervure of the fore wing as in that genus, the third, however, being emitted sooner and consequently longer. Upperside of fore wing with a large elongate-oval glandular patch below the median nervure, placed obliquely across the wing and divided

<sup>1</sup> Messrs. Godman and Salvin's collection contains male specimens of *P. hypoleuca*, Hew., from Malang and Lawang—both in Java—which on examination prove to belong to *Pseudomyrina*. They possess tails of about the same length as *P. martina*, but rather slighter; that on the submedian nervure being white, that on the first median nervule black with white tip, and white fringe. Dr. Staudinger has sent specimens of *P. hypoleuca* from Java under the name "*manerta*," Stand., but I do not know where he has described it. He has also sent me for examination the type female of his *Sithon paluana*, which I find is identical with the female of *C. martina*, Hew.

down the middle and having much the appearance of a grain of wheat inverted; at the upper (basal) end of this patch is, attached to the membrane of the wing, a tuft of long pale brown hairs which can apparently stand erect, lie flat over the patch, or be so enclosed by the two halves of the patch as to be visible only at the base. The submedian nervure is much affected by the patch and is bent towards the inner margin where it passes it.

Type, *Sithon scopula*, Druce.

This remarkable genus is, so far as I can ascertain, monotypic, and with *Thrix*, Doherty<sup>1</sup>, presents the peculiarity of having the glandular patch as well as the tuft of hairs on the fore wing on the upperside. The scaly patch is very curious and causes a considerable erection on the underside. It seems possible that the insect has the power of sheathing the long tuft of hairs, at any rate I have before me specimens which show it individually in the three positions described above. I notice also that all around the patch the scales are rubbed away as if from the continued friction caused by the whisking of these hairs. It is a very interesting insect, and when some one is able to observe it in nature we shall doubtless learn more of its peculiarities.

#### VIRGARINA SCOPULA.

*Sithon scopula*, Druce, P. Z. S. 1873, p. 353, pl. xxxiii. fig. 2.

♂. Upperside—fore wing rich purplish brown, with all the margins lighter, the outer margin being more broadly so. Hind wing: upper half, including apex, dark brown; lower half light cærulean blue, sprinkled with whitish towards the anal angle. A series of three indistinct whitish spots in the interspaces, two between the median nervules and one between the submedian nervure and the 1st median nervule, and crowning these whitish spots are three indistinct small patches of scattered black scales. Lobe but slightly developed, white, with a marginal black spot on its upper edge. Cilia of fore wing brown; of hind wing brown, down to the edge of the blue, when it becomes pure white and is so continued to the anal angle; tails pure white. Underside yellowish buff-colour, corresponding with the brown of the upperside on both wings; lower half of hind wing white, with a somewhat irregular brown band composed of confluent lunules placed about halfway between the middle of the wing and the margin. A series of four distinct black spots towards the anal angle, situated as follows: the first, and smallest, close to the margin between the median nervure and the second median nervule; the second, large, between the first and second median nervules; the third intermediate in size between these two, placed much farther from the margin and consequently out of line, and in that respect corresponding with the portion of the brown band which is immediately over it; the fourth spot, which is small, is placed on the margin over the lobe and is in line with the first two. There

<sup>1</sup> *Thrix*, J. A. S. B. vol. lx. pt. 2, p. 35 (1891), described as having four subcostal nervules to fore wing.

are indications of brownish marks close to the margin between the nervules beyond the spots. There is an anteciliary black line to that part of the hind wing which is white, and beyond a white cilium. The cilia of fore wing and remaining portion of hind wing concolorous with wings.

♀. Upperside much like that sex of *P. martina*, Hew., but the white anal area of hind wing more extensive, with the black spots more inclined to be separated and the nervules crossing the white area white, not brown as in that species. Underside as male, but the yellow of a much brighter shade and the black markings on hind wing inclined to be larger and more distinct.

Kina Balu (*Waterstr.*); Labuan (*Low and Waterstr.*); Sandakan (*Elwes*).

In the figure given of this species (P. Z. S. 1873) the tuft of hairs appears to lie along the median nervure from the base. This is incorrect, as it does not originate near the base but just over the glandular patch. The female can be distinguished from that sex of *P. martina* by the inner black band on hind wing being (as in the male) placed farther from the margin than in that species.

*V. scopula* varies much in size, one male measuring  $1\frac{3}{10}$  inch, whilst another expands  $1\frac{7}{10}$  inch.

The female has three subcostal nervules as in the male.

#### NEOCHERITRA, Distant.

##### NEOCHERITRA AMRITA.

*Myrina amrita*, Feld. Wien. ent. Monatsch. vol. iv. p. 395 (1860).

Labuan (*Low and Wahnes*); S.E. Borneo, near Banjarmasin (*Wahnes*).

##### Var. THEODORA.

*Neocheritra theodora*, H. H. Druce, Ent. Mo. Mag. vol. xxii. p. 155 (1885).

Elopura (*Pryer*).

Differs from the typical form by the blue on the upperside being rather more extensive and of a paler, greenish shade, but on the underside cannot be separated.

I have examined the specimen from Singapore figured by Mr. Distant<sup>1</sup> as the female of *N. amrita* and find that it is that sex of *Jacoona anasuja*, Feld., the black streak at the base of the costal nervure being distinctly present, although it has apparently escaped the notice of both its describer and his artist.

##### NEOCHERITRA TEUNGA.

*Sithon teunga*, Grose Smith, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 317 (1889).

Kina Balu (*Whitehead*).

I have not seen this species, which appears to be very distinct.

<sup>1</sup> *Neocheritra amrita*, Dist. Rhop. Malay. p. 252, pl. xx. fig. 15 (1885).

Mr. de Nicéville supposes it to belong to this genus (J. A. S. B. vol. lxiii. pt. ii. no. 1, p. 43, 1894).

JACOONA, Distant.

JACOONA JUSANA, sp. n. (Plate XXXIV. fig. 3 ♂.)

♂. Allied to *J. anasuja*, Feld. Upperside—fore wing: outer margin convex, and with the blue fascia which is beyond the cell large and semicircular, extending from the costal margin across the wing down to the first median nervule and almost reaching the outer margin; the inner marginal blue area is also much more extensive, and reaches nearly to the anal angle. Hind wing with the blue area also much more extensive; the black marginal spot between the first and second median nervules much smaller; a distinct black line along the centre of the tail (not always present), and with the apex considerably more produced. Underside ochraceous hoary, but without the rufescent brownish; the outer margins as in *J. anasuja*, and with the third spot of the inner series and the corresponding spot of the outer series small and straight; a prominent black streak at the base of the costal nervure in the fore wing.

♀ much like that sex of *N. amrita*, Feld. Upperside white; anal area more extensive, and the black spots more inclined to separate. Underside as ♂, but yellowish ochraceous.

Expanse, ♂  $1\frac{4}{5}$ , ♀  $2\frac{1}{5}$  inches.

Sandakan (*Mus. Druce*); Labuan (*Waterstr.*, *Mus. Staud.*).

Messrs. Godman and Salvin possess a male *J. anasuja*, Feld., from Sumatra (*Sachs*), also a female from Singapore.

The females in this genus have the same number of subcostal nervules in the fore wing as the males, but the first branch is entirely separate from the costal nervure. They closely resemble those of *N. amrita*, with which species they have doubtless often been confounded, and like that species possess a tail on the lower median nervule (which is, however, shorter); but they can be at once distinguished from that species by the presence on the underside of the prominent black basal streak in the fore wing.

JACOONA METASUJA, sp. n. (Plate XXXIV. fig. 4 ♂.)

*Iobus metasuja*, Staud. MS.

♂. Allied to *J. jusana*, paler and brighter blue with greenish reflections; the band on the fore wing, beyond the cell, much narrower and shorter, and the blue basal area shorter. Underside as in *J. jusana*.

♀. Upperside differs from ♀ *jusana* by the white anal area being more extensive and the black spots entirely separated. Underside as ♂.

Expanse, ♂  $1\frac{9}{10}$ , ♀ 2 inches.

Kina Balu (*Waterstr.*). Types *Mus. Staud.*

The greenish reflections and the narrow blue apical band give *J. metasuja* a very distinct appearance. The females of the three

described species are much alike, but in the examples before me do not show any variation. Dr. Staudinger has received a considerable number of female *metasuja* from Kina Balu.

#### CHERITRA, Moore.

##### CHERITRA FREJA, var. OCHRACEA, nov.

*Hesperia freja*, Fab. Ent. Syst. iii. p. 263 (1793).

*Sithon freja*, Druce, P. Z. S. 1873, p. 351.

*Cheritra freja*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 269 (1887).

Differs from the Continental Indian form by the whole of the fore wing as well as the costal half of the hind wing below being ochraceous, and by the inner black band towards the anal angle being much broader and less broken.

Sandakan (*Pryer*); Labuan (*Low* and *Waterstr.*); Sarawak, S.E. Borneo.

This apparently is the usual Bornean form of the species, as in a large number of specimens before me there is no variation. Mr. Distant's figure<sup>1</sup> of *C. freja* shows a form intermediate between the Indian and Bornean representatives.

##### CHERITRA PALLIDA.

*Sithon pallida*, Druce, P. Z. S. 1873, p. 352, pl. xxxiii. fig. 3.

*Sithon pallida*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 268 (1887).

Sandakan (*Pryer*); Labuan (*Low*).

I have examined the type of this species and find that it is nearly allied to *C. freja* var. *ochracea*, the tails on the first median nervule being broken off. It agrees in neuration exactly with that species. On the upperside it can be distinguished by its rich purple colour in all lights, and by the distinct and even black margins. On the underside it differs from *C. freja* var. *ochracea* only by the black markings being more extensive and by the inner black band being situated higher up the wing. The metallic blue line is placed on the black, not above it as stated in the original description, and the black spot in the submedian interspace, which in *C. freja* and in var. *ochracea* is nearly obsolete, is in *C. pallida* large and distinct.

The type specimen, now in Messrs. Godman and Salvin's collection, is the only specimen I have seen.

It is, I believe, a perfectly good and distinct species.

#### RITRA, de Nicév.

Butt. India etc. iii. p. 411 (1890).

##### RITRA AUREA.

*Sithon aurea*, Druce, P. Z. S. 1873, p. 352, pl. xxxiii. fig. 1.

*Ritra aurea*, de Nicév. Butt. India etc. iii. p. 411 (1890).

<sup>1</sup> Rhcp. Malay. pl. xx. fig. 10 (1885).

♀. Upperside—fore wing dark brown, with the disc thickly dusted with cupreous-orange scales: hind wing dark brown, crossed below the middle by a band composed of white crescent-shaped lunules divided by the brown veins; beyond this two large brown spots which crown two rather large white spots; an anteciliary brown line: tails more slender than in ♂, with brownish central lines. Underside as in ♂, but paler.

Labuan (*Low and Waterstr.*).

Both sexes are contained in Messrs. Godman and Salvin's collection, including the type. The extent of cupreous orange on the upperside varies considerably in the female, as in one specimen sent by Dr. Staudinger the apex and outer margin of the fore wing only are brown.

#### HORAGA, Moore.

HORAGA CORNICULUM, sp. n. (Plate XXXIV. fig. 8 ♂.)

♂. Closely allied to *H. holothura*, Swinhoe, from which it differs on the upperside by the blue colour being of a paler and duller shade and not extending beyond the discal spot except below the first median nervule. The white discal spot is smaller and sharply bordered by the lower median nervule, not continued below it as in *H. holothura*. Underside—ground-colour rather paler than in *H. holothura*, but the white discal band, which commences on the subcostal nervule, narrower and pointed in the fore wing and of about equal width in the hind wing. Thorax and abdomen bluish above, whitish below. Legs white, with black spots.

Expanse  $1\frac{3}{10}$  inch.

Kina Balu (*Waterstr.*). Type Mus. Staud.

The black spots and metallic markings towards the anal angle below are arranged as in *H. holothura*, Swinhoe, from Java, in which, judging from four specimens before me, I can detect no variation.

HORAGA AFFINIS, sp. n. (Plate XXXIV. fig. 9 ♂.)

*Sithon affinis*, Stgr. MS.

♂. Allied to *H. corniculum*, but the blue colour darker in shade and less extensive in the fore wing. The white discal spot is very small indeed, and is divided by the two brown median nervules just at their origin. Underside much like that of *H. corniculum*, but darker and the discal bands rather narrower. Thorax and abdomen bluish above, yellowish beneath. Legs white, with black spots.

Expanse  $1\frac{2}{5}$  inch.

Kina Balu and Labuan (*Waterstr.*).

The type specimen from Labuan is in Dr. Staudinger's collection. The example from Kina Balu has the lower half of the white discal spot on the fore wing above rather larger than the type, and the blue area is rather paler; on the underside it is the same.



*H. affinis* and *H. corniculum* both possess the oval ochreous patch on the underside of the fore wing near the middle of the submedian nervure.

HORAGA MÆNALA.

*Myrina mænala*, Hew. Ill. Diurn. Lep., *Lyc.* (Supp.) p. 7, pl. iii. figs. 85, 86 (1869).

Borneo (*Hew.*).

This insect is known to me only by Hewitson's type in the British Museum. It is, I believe, the only species of the group without a white discal spot on the fore wing above.

CATAPECILMA, Butler.

CATAPECILMA ELEGANS.

*Hypochrysops elegans*, Druce, P. Z. S. 1873, p. 351, pl. xxxii. fig. 12.

*Catapecilma elegans*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 267 (1887).

Labuan (*Low and Waterstr.*); Sandakan (*Pryer*).

The two Bornean specimens (females) before me differ from Sikkim examples by the central band on the fore wing below being straight, not Y-shaped, as appears to be invariably the case in Indian specimens, also in those from Ceylon, and again from Sumatra. On such slight material I do not propose to admit at present that the Indian representatives belong to a distinct species (they are certainly not typical), but in the event of their requiring a name I would suggest *major*.

The type is in Messrs. Godman and Salvin's Collection, and is in rather bad condition.

The figure given in the P. Z. S. 1873, pl. xxxii. fig. 12, is a very poor one, but suffices to show that the band on the fore wing is straight. Since the above was written Dr. Staudinger has sent me a male from Labuan which differs from Sikkim males by being entirely without the black outer margins to both wings on the upperside.

SEMANGA, Distant.

(*Keraunogramma*, Röber.)

SEMANGA SUPERBA.

*Ilerda? superba*, Druce, P. Z. S. 1873, p. 350, pl. xxxii. fig. 11, ♀.

♂. Upperside dark shining purple with brown borders; fore wing with a large central patch of darker, differently-placed scales; hind wing with an orange patch divided by the brown nervules as in the ♀. Underside as ♀.

Hind wing with two tails only, viz., a short one on the lower median nervule and a rather long one on the submedian nervure.

Labuan (*Low and Waterstr.*).

The male described above is from Dr. Staudinger's collection, and has the same number of subcostal nervules in the fore wing as the female, but has two tails only in place of three. The type (a female) is now in Messrs. Godman and Salvin's collection, but is somewhat mutilated, having lost its head and fore legs. The figure given in the P. Z. S. is a fairly good one, excepting that the median line on the fore wing is too distinct.

*K. (=S.) helena*, Röber, *Iris*, i. pt. 3, p. 198, pl. ix. fig. 6, is a closely allied species (if, indeed, it is distinct), which appears to have the purple colour rather less extensive on both wings.

#### BIDUANDA, Distant.

Below will be found described two remarkably interesting new species of this genus, viz. *B. similis* and *B. imitata*, both of which agree exactly in venation with the type of the genus, *B. thesmia*, Hew., and possess three subcostal nervules to the fore wing. They are remarkable in both being identical in other respects with two well-known species of the genus *Marmessus*<sup>1</sup>, Hubn.,—*B. similis* being like *M. moorei*, Distant, whilst *B. imitata* is again the facsimile of *M. boisduvalii*, Moore. Boisduval (*Spec. Génér.* i. pl. 22) figures both *M. lisias*, Fab. (= *M. boisduvalii*, Moore), and *M. ravindra*, Horsf., with three subcostal nervules to the fore wing; but as these drawings are obviously incorrect—the costal nervure appearing to be given off from the subcostal nervure—I do not think any reliance can be placed upon them, at any rate *M. ravindra* and *M. boisduvalii*, as we now know them, have not this third subcostal nervule.

#### BIDUANDA THESMIA.

*Myrina thesmia*, Hew. *Ill. Diurn. Lep.*, *Lyc.* p. 32, pl. xiv. figs. 25–27 (1863).

Labuan (*Low*); Sarawak (*Wallace, Wahnes*).

Messrs. Godman and Salvin's collection contains two female specimens, which agree with Hewitson's type and also with a Sumatrau female. Wahnes has also sent it to Dr. Staudinger from Labuan.

#### Var. UNICOLOR.

*Sithon thesmia*, var. *unicolor*, Staud. *Iris*, ii. p. 111 (1889).

Labuan (*Low*); Sandakan (*Pryer*); Elopura (*Pryer*); Kudat (*Mus. Druce*); Kina Balu (*Waterstr.*).

This appears to be the common form in Borneo and agrees exactly with Dr. Staudinger's type from Palawan. Some females are entirely without the white scales at the anal angle of the hind wings.

It is distinguished from the typical form by the underside being dull reddish brown in place of rufous orange.

<sup>1</sup> Mr. de Nicéville states that this name should be used in place of *Drupadia* Moore.

It also occurs in N.E. Sumatra.

Some males have a large orange spot on the disc, others a small one, and others again are without any.

BIDUANDA ESTELLA, var.

*Sithon estella*, Hew. Ill. Diurn. Lep., *Lyc.* p. 31, pl. xvi. figs. 50, 51 (1863).

Kina Balu Mts. (*Waterstr.*).

Dr. Staudinger has sent me a pair (♂ ♀) which agree well with Hewitson's types from Sumatra, but are somewhat larger. It is distinguished at once from *B. thesmia* by the broken band on the fore wing below. The specimens referred to *Sithon estella* by Mr. Herbert Druce (*P. Z. S.* 1873, p. 352) are *B. unicolor* described above.

BIDUANDA THLENIA, sp. n. (Plate XXXIV. fig. 2 ♀.)

♀. Upperside dull brown; fore wing crossed about the middle with an oblique, whitish, indistinctly bordered band reaching from the subcostal nervure, where it is narrowest, nearly to the submedian nervure. Hind wing narrowly whitish along the costal margin; three blackish spots at the anal angle between the tails. Underside white, with spots and markings arranged as in Hewitson's figure of *B. theda*; but the spots in the cell of the fore wing are reduced to mere dots, and the markings on the hind wing are linear excepting those near the base.

Expanse  $1\frac{1}{5}$  inch.

Sandakan (*Pryer*). Mus. G. & S.

The type specimen is unique. When the male is found it will probably be much like that sex of *B. theda*, Hew., and *B. thesmia*, Hew. It can be distinguished from *B. theda* by the linear markings on the hind wings below, and the much less distinct whitish band on the fore wing above.

BIDUANDA CINESIA.

*Myrina cinesia*, Hew. Ill. Diurn. Lep., *Lyc.* p. 29, pl. xiii. figs. 18, 19 (1863).

♀. Upperside dull blackish brown; fore wing slightly tinged with cupreous towards the centre; hind wing darker towards anal angle, and with a broad, distinct, waving white band not crossed by dark nervules, margin dusted with white between the tails. Tails equal in length to those of male. Underside as in male.

Expanse  $1\frac{3}{5}$  inch. (Hew. fig. ♂  $1\frac{7}{10}$  inch.)

Sarawak (*Hew.*); Elopura (*Pryer*); Kina Balu (*Waterstr.*).

Hewitson's figure of the female undoubtedly represents another species, as, besides being smaller and having the central tail considerably longer than in *B. cinesia*, it presents other differences which I have described below.

Mr. Pryer took this species in March.

Dr. Standinger has received both sexes from Kina Balu, the

female having the white band slightly wider than the typical form.

BIDUANDA CINEAS.

*Sithon cineas*, Grose Smith, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 318 (1889).

Kina Balu (*Whitehead*).

Mr. Grose Smith states that this species is nearest to *S. cinesia*, Hew., and *S. maneia*, Hew. The type is in Mr. Whitehead's collection. I have not seen a specimen, but it would appear to be quite distinct. *S. cineas*, Hew., and *S. maneia*, Hew., are, however, not allied to each other.

BIDUANDA HEWITSONII, sp. n.

*Myrina cinesia*, ♀, Hew. Ill. Diurn. Lep., *Lyc.* p. 29, pl. xii. fig. 20 (1863).

♀. Allied to *B. cinesia* but smaller; upperside with the white band rather narrower and divided by brown nervules. Underside ochreous yellow, darker and richer in colour, the inner black band on the hind wing narrower and not so much waved; the outer black band also is straighter and is without the distinct black tooth which is so conspicuous in *B. cinesia*. Middle tail considerably longer.

Expanse  $1\frac{1}{10}$  inch.

Elopura (*Pryer*) (*Mus. Druce*); Labuan (*Waterstr.*).

The specimen described above was taken by Mr. Pryer in March and agrees exactly with Hewitson's figure, no. 20, plate xii., which, now that we have the correct female of his *B. cinesia*, requires a name.

*B. hewitsonii* should be easily distinguished from *B. cinesia* on the upperside by the white band on the hind wing being crossed by brown nervules.

The male is unknown.

Dr. Staudinger has sent me two females, and Mr. H. Grose Smith possesses one specimen, also a female.

BIDUANDA STAUDINGERI, sp. n. (Plate XXXIV. figs. 5 ♂, 6 ♀.)

♂. Upperside—fore wing dark purplish blue, outer margin narrowly and evenly black, costal margin very narrowly black; cilia black. Hind wing dark purplish blue, costal and outer margin down to third median nervule narrowly and evenly black; anal third, including tails, cream-white, with a black band beyond its middle divided by the nervules, extending from the second median nervule at the point at which the wing is dentated to the lobe, the inner edge of the white area being sinuous; cilia along costal margin and apex pale yellowish, rest of wing white. Costal fold bluish grey. Underside pale brown, darker towards apex and outer margin of fore wing, palest towards anal angle of hind wing; a faint wavy dark line in fore wing beyond the middle, commencing

near the costa and becoming more distinct towards the submedian nervure, on which it broadens into an irregular spot. Hind wing with a similar faint wavy line beyond the middle, starting on the costa and running nearly straight to the second median nervule, where it turns at right angles, and becoming suddenly darker and thicker reaches almost to the anal margin just before the extremity of the abdomen; a large black spot on the lobe crowned with metallic green; a black mark between the submedian nervure and another joining it between the two lower median nervules, both covered with metallic green scales; a thin black marginal line above the lobe, running into the dark band, also dusted with metallic green; dark auteciliary lines towards the anal angle. Cilia of fore wing dark brown, of hind wing pale brown at apex, nearly white towards anal angle. Tails on both surfaces unmarked. Head, thorax, abdomen, and legs concolorous with wings; tarsi black-spotted.

♀. Differs from the male only by upperside being rich dark brown in place of purplish blue, and the anal region pure white in place of cream-white. Underside as male, but the pale brown replaced by rich ochreous brown.

Expanse, ♂  $1\frac{1}{10}$ , ♀  $1\frac{3}{5}$  inch.

Kina Balu (*Waterstr.*).

I have named this fine species after Dr. Staudinger, whose kindness and generosity have enabled me to describe and figure it here. The types are in his collection. It is not a little remarkable in that both sexes are nearly alike on the upperside, the female only differing from the male by being brown in place of blue. The third (upper) tail is very slightly developed in the male, but is well marked in the female. *B. staudingeri* is not closely allied to any other species.

#### BIDUANDA SIMILIS, sp. n.

♂. Upperside—fore wing dark rich brown; hind wing shining cærulean blue, with brown apex and costal margin, two black spots near anal angle; cilia of fore wing brown, of hind wing white. Underside—fore wing reddish orange with brown markings; hind wing white, with dark brown markings and bands, reddish along the costal margin and dusted with shining silvery green scales towards the anal angle. Outer margin of fore wing more convex, about equal to that of *M. moorei* ♀.

Expanse  $1\frac{7}{10}$  inch.

Borneo. Type Mus. Druce.

This butterfly differs from the common *Marmessus moorei*, Distant, with which it occurs, only by the presence of an additional subcostal nervule, and by the outer margin being more convex. The type specimen, so far as I know, is unique, as after examining a large series of *M. moorei* I have failed to find another example. This specimen, together with the type of *B. imitata*, mihi, next described, was formerly in the Rev. R. P. Murray's collection, but unfortunately the precise locality in Borneo is not noted.

## BIDUANDA IMITATA, sp. n.

♀. Upperside much like *M. boisduvalii*, Moore, ♀, differing only from that species by the greyish-blue scales towards the anal angle of the hind wing being more extensive. Underside—ground-colour of fore wing pale yellow, whitish at the base and with a broad pale brown apex; a short dark brown streak near the base, a circular dark brown spot ringed with white between the base and a broad brown band which crosses the middle of the cell; a short pale band closing the end of the cell, with a separated spot over it close to the costal margin, beyond this a dusky, dark-bordered, rather broad band from the second subcostal nervule to the submedian nervure, broken on the third median nervule and palest in median interspaces, and halfway between this and the outer margin a dusky line divided by the nervules. Hind wing with markings and spots arranged as in *M. boisduvalii*, but all of a dark brown colour and with the apex very faintly pale yellowish.

Expanse  $1\frac{1}{2}$  inch.

Borneo. Type Mus. Druce.

*B. imitata* is remarkable for its close resemblance to *M. boisduvalii*, but we have no knowledge of that species occurring in Borneo.

## MARMESSUS, Hübn.

(*Drupadia*, Moore.)

## MARMESSUS MOOREI.

*Sithon moorei*, Dist. Ann. & Mag. Nat. Hist. ser. 5, vol. x. p. 246 (1882); Rhop. Malay. p. 236, pl. xx. figs. 21, 29, 30 (1886).

*Sithon ravindra*, Druce (nec Horsf.), P. Z. S. 1873, p. 351.

Kina Balu (*Waterstr.*); Elopura (*Pryer*); Labuan (*Low* and *Waterstr.*); Daat Island (*Distant*); Trusan and Lawas (*Everett*).

This is a common insect at Labuan, and Mr. Low's collections contained a large number of specimens.

## MARMESSUS SURINDRA, sp. n. (Plate XXXIV. fig. 7 ♂.)

♂. Closely allied to *M. ravindra*, Horsf., from which it differs on the upperside by the blue on the hind wing, which is of a deeper shade, extending to the apex and close along the subcostal nervure to the glandular patch; and on the underside by the band beyond the cell in the fore wing being linear its entire length, not widening out at the end of the cell as in that species.

## Var. ALBULA, nov.

♂. Differs on the underside by the ground of the fore wing being pure white, with the apex and outer margin fuscous ochreous, and the black markings on both wings smaller.

♀. Upperside dark brown, bluish grey towards anal angle. Underside as male.

Kina Balu (*Waterstr.*); Sandakan (*Pryer*); S.E. Borneo (*Wahnes*). Mus. G. & S., Staud., and Druce.

*M. surindra* may prove to be a seasonal form of *M. moorei*, but at present we have no evidence in that respect. The var. *albula* appears to be as common as the typical form at Sandakan, whence all the specimens I have examined have come. Messrs. Godman and Salvin possess a male and female from Palawan, which agree with var. *albula*. Dr. Staudinger has sent me the types of his *S. ravindrina*, ♂ ♀; these agree with *S. surindra*, but on the underside the fore wings are bright ochreous yellow.

Messrs. Distant and Pryer record *D.* (= *M.*) *ravindra*, Horsfield, from Sandakan, but as the specimens represent *M. surindra* I have not included the species in my list.

### EOOXYLIDES, de Nicév.

#### EOOXYLIDES THARIS.

*Oxyliodes tharis*, Hübn. Zutr. exot. Schmett. figs. 883, 884 (1837).

*Sithon tharis*, Druce, P. Z. S. 1873, p. 351.

*Hypolyccena tharis*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 268 (1887).

Kina Balu (*Everett* and *Waterstr.*); Trusan (*Everett*); Labuan (*Low*); Sarawak (*Staud.*); Sandakan.

Bornean specimens of this insect show scarcely any (and in some examples no) trace of the blue scales along the inner margin of the fore wing above, in the male, which character seems best developed in specimens from Nias Island, which possess it in a marked degree—in one example in our collection it extends from the margin to the middle of the cell<sup>1</sup>.

#### EOOXYLIDES ETIAS.

*Hypolyccena etias*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 268 (1887).

Sandakan (*Pryer*).

I have not seen this species, and have placed it in this genus judging from the description and the remark that it is allied to *H.* (= *E.*) *tharis*. It appears to have a more extensive white area on the hind wing above than that species.

### LOXURA, Horsf.

#### LOXURA ATYMNUS.

*Papilio atymnus*, Cr. Pap. Exot. vol. iv. p. 82, pl. cccxxxi. figs. D, E (1780).

*Myrina atymnus*, Druce, P. Z. S. 1873, p. 353.

*Loxura cassiopea*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 269 (1887).

<sup>1</sup> *Myrina meduana*, Hew., which has been referred to *Eooxyliodes* by Herr Semper (Reise Phil. Ins.), has the glandular patch in the male oblong and placed at the end of the cell. The neuration, however, appears to be much the same.

Labuan (*Low and Waterstr.*); Sandakan (*Pryer*).

All Labuan specimens I have examined are dark in colour, even darker than the S. Indian form named *L. surya* by Mr. Moore.

#### DRINA, de Nicév.

##### DRINA NINODA, sp. n.

♂. Allied to *D. donina*, Hew., but larger and with a distinct white spot close to outer angle of fore wing in the submedian interspace, and two dull brownish-green pale patches—one, an elongate oval, between the first and second median nervules; the other placed below it in the submedian interspace, square. Under-side: bands broader and more distinct, notably that one which crosses the fore wing beyond the cell, which is also straighter.

Expanse  $2\frac{2}{5}$  inches.

Labuan (*Low*). Type Mus. G. & S. Sandakan (*Elwes*).

Although closely allied to *D. donina*, the additional patches and spot described above are sufficient to distinguish it. I have examined a number of *D. donina* from Burmah, but find no traces of these patches in any of them.

##### DRINA MANEIA.

*Myrina maneia*, Hew. Ill. Diurn. Lep., *Lyc.* p. 29, pl. xii. figs. 14, 15 (1863).

*Sithon maneia*, Druce, P. Z. S. 1873, p. 351.

Labuan (*Low and Waterstr.*).

Messrs. Godman and Salvin's collection contains two males of this species, one of which agrees with Hewitson's figure, with the addition of the brown lines and nervules as described by Mr. Doherty in a specimen from Perak (*J. A. S. B.* vol. lx. pl. 2. no. 1, p. 34, 1891); the other, which is somewhat larger, has a much narrower brown outer margin to the fore wing, and is without the brown lines and nervules. Dr. Staudinger has sent me the female.

#### ARAOTES, Doherty<sup>1</sup>.

##### ARAOTES LAPITHIS.

*Myrina lapithis*, Moore, Horsf. & Moore, Cat. Lep. Mus. E. I. C. vol. i. p. 48 (1857).

*Sithon lapithis*, Druce, P. Z. S. 1873, p. 351.

Labuan (*Low and Wahnes*); S.E. Borneo, near Banjarmasin (*Wahnes*).

The width of the white band on the fore wing below varies somewhat. It is a common species—the male apparently being most seldom met with, as out of 15 specimens before me three only are of that sex.

Messrs. Godman and Salvin's collection contains a female from Sumatra (*Sachs*).

<sup>1</sup> *Nec* de Nicév., *vide* Zool. Record, 1889.



## SITHON, Hübn.

## SITHON NEDYMOND.

*Papilio nedymond*, Cram. Pap. Exot. vol. iv. p. 19, pl. ccxcix. figs. E, F, ♂ (1780).

*Thecla chitra*, Horsf. Cat. Lep. E. I. C. p. 97, pl. i. fig. 5, ♀ (1829).

S.E. Borneo, near Banjarmasin (*Wahnes*); S. Borneo (*coll. G. & S.*).

I quite agree with Mr. de Nicéville that *P. nedymond*, Cr., and *T. chitra*, Horsf., are respectively male and female of one species. Messrs. Godman and Salvin's collection contains a female from Bankasoon, Burmah (*Hume*), which on the underside is exactly intermediate in colour and markings between the usual forms of the two sexes.

## SITHON MICEA.

*Myrina micea*, Hew. Ill. Diurn. Lep., *Lyc. Supp.* p. 6, t. 3. fig. 81, ♂ (1869).

*Sithon valida*, Druce, P. Z. S. 1873, p. 352, pl. xxxiii. fig. 4, ♀.

Kina Balu (*Waterstr.*); Labuan (*Low*).

The male of *S. micea* is easily distinguished from that sex of *S. nedymond* by the coloration of the underside, by the blue area of the fore wing reaching close down to the outer angle, and by the blue band on the outer margin of hind wing being much broader. The tuft of hairs attached to the inner margin of fore wing on the underside is a darker shade of buff than in *S. nedymond*, and both wings are narrower and longer.

The female, however, is so close to that sex of *S. nedymond* that I am unable to state how it can be distinguished. The inner black band on the hind wing below is generally broader than in *S. nedymond*, but this is a variable character in the 4 specimens I have examined, including the type (a female), which are in Messrs. Godman and Salvin's collection. There can be, I think, no doubt that *S. valida* is the female of *S. micea*, as both have been sent together from Labuan and Kina Balu, whilst true *S. nedymond* appears only to occur in Southern Borneo.

The original description of *S. valida* is quite incorrect, the insect being on both surfaces practically indistinguishable from *S. chitra*, Horsf. The figure also is indifferent and does not show the marks at the ends of the cells nor the median darker lines.

The expanse of the type specimen is  $1\frac{3}{10}$  inch, not 1 inch as stated, whilst other specimens measure  $1\frac{1}{2}$  inch.

## DEUDORIX, Hew.

## DEUDORIX EPIJARBAS.

*Dipsas epijarbas*, Moore, Horsf. & Moore, Cat. Lep. Mus. E. I. C. vol. i. p. 32 (1857).

*Deudorix epijarbas*, Druce, P. Z. S. 1873, p. 353.

Labuan (*Low and Waterstradt*).

Several specimens quite typical.

DEUDORIX STAUDINGERI, sp. n. (Plate XXXIV. fig. 10 ♂.)

♂. Upperside dark brown; fore wing dusted with reddish brown, of a darker shade than in *D. epijarbas* and much less extensive. Hind wing: outer margin, from subcostal nervule where it is broadest to lobe rather narrowly and evenly dark reddish brown, crossed by black nervules; the three median nervules dusted with reddish brown from their bases nearly to the brown outer margin. Lobe yellow, with a large black spot and a few blue scales. In some lights both wings are suffused with dark purple, that on the hind wing being most conspicuous. Underside much as in *D. epijarbas*, with a slightly reddish tinge and the white lines rather more sordid. Abdomen reddish brown above, pale buff below.

Expanse  $1\frac{9}{10}$  inch.

Labuan (*Waterstr.*).

I have named this fine species after Dr. Staudinger, by whose kindness I am able to describe it here and whose collection contains the type and only specimen I have seen. It is a true *Deudorix* as defined by Mr. de Nicéville and should be easily recognized.

RAPALA, Moore.

RAPALA DELIOCHUS.

*Deudorix deliochus*, Hew. Trans. Ent. Soc. 1874, p. 352; id. Ill. Diurn. Lep., *Lyc.* Supp. p. 31, pl. v. a. figs. 68, 69, ♂ (1878).

Labuan (*Waterstr.*).

Dr. Staudinger has sent a single female of this species which agrees well on the underside with Hewitson's type. *Thecla* (= *R.*) *kessuma*, Horsf., which we possess from Java (♂ ♀), and which I have compared with Horsfield's type (♀) in the British Museum, is a very closely allied species; the male on the upperside is scarcely distinguished from that sex of *R. deliochus*, but the female *kessuma* has a larger and paler blue area. On the underside the ground-colour of *R. kessuma* is paler and the white band at the end of the cell, which in *R. deliochus* is continued straight almost to the submedian nervure, is in *R. kessuma* broken at the third median nervule, the lower portion being placed further out and closer to the third band. From the available material these differences, although slight, seem to hold good, but when more specimens can be examined it may be found that the two species are synonymous. Mr. de Nicéville has described the female *deliochus* from Rangoon (*Butt. Ind. etc.* iii. p. 457). They are very curious species, and I may mention that I found Horsfield's type in the British Museum collection placed under the genus *Nacaduba*, species of which on the underside it much resembles.

RAPALA SPHINX.

*Papilio sphinx*, Fab. Syst. Ent. p. 520 (1775).

Kina Balu (*Waterstr.*).

The apex of the fore wing is less broadly black in specimens

before me than is usual in Javan specimens. The dark fasciæ on the underside vary somewhat in width.

RAPALA SCHISTACEA.

*Deudorix schistacea*, Moore, P. Z. S. 1879, p. 140.

S.E. Borneo, near Banjarmasin (*Wahnes*).

The underside has a purplish tinge, as is usual in Javan specimens. It appears to be common there, as we have received a number of specimens.

RAPALA SCINTILLA.

*Rapala scintilla*, de Nicév. Butt. Ind. etc. iii. p. 461 (1890).

Kina Balu (*Waterstr.*).

Waterstradt's specimens are identical with some in our own collection from Sikkim. It is a very distinct species.

RAPALA VARUNA.

*Thecla varuna*, Horsf. Cat. Lep. E. I. C. p. 91 (1829).

*Deudorix orseis*, Hew. Ill. Diurn. Lep., *Lyc.* p. 23 (1863); Druce, P. Z. S. 1873, p. 353.

*Deudorix kinabalina*, Staud. MS.

Kina Balu (*Waterstr.*); Labuan (*Low and Waterstr.*).

I have examined Horsfield's type in the British Museum and find that it is the form in which the discal bands on the underside are broad and amalgamated with the bands closing the ends of the cells as described by Mr. de Nicéville; both forms occur together with intermediates in Borneo and in Java as they do Sikkim, so I do not hesitate to sink Hewitson's name. The ground-colour also varies from stone-colour to dark chocolate-brown.

Below<sup>1</sup> will be found the description of a species obtained in large numbers in S. Celebes by Mr. Doherty, and for which I am unable to find a name. Dr. Holland, in his "List of the Diurnal Lepid. taken by Mr. Doherty in Celebes" (P. Boston Soc. Nat. Hist. vol. xxv. 1890), does not mention it.

<sup>1</sup> RAPALA OLIVIA, sp. n. (Plate XXXIV. fig. 16 ♂.)

♂. Upperside allied to *R. orseis* (= *R. varuna*), and like that species without any purple gloss, but with the apex of the fore wing a blacker shade of brown and with the green more extensive, especially in the hind wing, where it reaches even closer up to the black anteciliary line. Cilia of hind wing pure white from just below apex to base of wing. Lobe pale orange with a black spot; extremity of cilia to lobe and between lobe and tail black. Fore wing without the patch of differently placed scales at the base of the median nervules. Underside dark greyish brown with a greenish tinge; both wings with the usual mark at the end of the cell and fascia, beyond both of which are distinctly bordered with sordid white, except towards the anal margin of hind wing, where the borders become pure white. The black lobe is large and prominent, as is also the black orange-crowned spot between the lower median nervules; a patch of blue scales in the submedian interspace close to the margin. Cilia of fore wing brown, of hind wing white as above. Abdomen blackish above, buff-colour below.

Expanse 1½ inch. Type Mus. Druce.

S. Celebes (August and September).

Dr. Staudinger having kindly sent me the types of his Palawan *Lycenidæ* for examination, I find that his *D. anabasis* is allied to *R. suffusa*, Moore, his *D. varuna*, Horsf. = *R. sphinx*, Fab., and that his *D. schistacea*, Moore, is a species without any purple gloss on either wing and = *R. orseis* = *R. varuna*.

#### RAPALA CHOZEBA.

*Deudorix chozeba*, Hew. Ill. Diurn. Lep., *Lyc.* p. 24, pl. v. figs. 47, 48 (1863).

Kina Balu (*Waterstr.*); Labuan (*Low and Waterstr.*).

Several specimens agreeing well with Hewitson's type. The female is dull purplish brown on the upperside, darkest at the margins and with darker veins; on the underside it is like the male. The species appears to be quite a distinct one.

#### RAPALA PHERETIMA.

*Deudorix pheretima*, Hew. Ill. Diurn. Lep., *Lyc.* p. 21, pl. ix. figs. 27-29 (1863).

*Deudorix metajarbas*, Staud. MS.

Kina Balu and Labuan (*Waterstr.*); Sarawak (*Hew.*).

*R. pheretima* apparently takes the place of *R. petosiris*, Hew., in Borneo. The lower half of the club of the antennæ is broadly white-ringed, giving it quite an unusual appearance; this, however, is present only in the male.

#### RAPALA XENOPHON.

*Hesperia xenophon*, Fab. Ent. Syst. vol. iii. pt. 1, p. 272 (1793).

Kina Balu, Labuan (*Waterstr.*).

♀ var. *CÆRULESCENS*.

*Deudorix intermedius*, var. *cærulescens*, Staud. Lep. Palaw. p. 116 (1889).

Sandakan (*Pryer*).

Messrs. Godman and Salvin's collection contains a female specimen which agrees well with Dr. Staudinger's type of *D. intermedius*, var. *cærulescens*; his male is identical with typical *xenophon*, Fab.

#### RAPALA BARTHEMA. (Plate XXXIV. fig. 11 ♂.)

*Deudorix barthema*, Dist. Rhop. Malay. p. 280 (1885).

♂. Differs from ♀ on the upperside by being darker brown, and by the hind wing being rich cupreous brown with the costal margin broadly brown and crossed by brown nervules. Underside as ♀. The tuft of hair at end of abdomen is buff-colour.

Kina Balu, Labuan (*Waterstr.*).

The male described above has no purple shading, and if I am correct in identifying the species it is not conspecific with *R. suffusa*, Moore, as suggested by Mr. de Nicéville (*Butt. Ind.* p. 467). I have before me two females which agree with Mr. Distant's

description, and which on the underside are exactly like the male here described.

RAPALA LAIMA, sp. n. (Plate XXXIV. fig. 12 ♂.)

♂. Upperside dull greyish brown, inner margin of fore wing, also disc of hind wing, in some lights slightly cupreous. Anal fold and sexual patch pale buff-colour. Lobe pale orange with a black spot. Underside much as in *R. barthema*, but considerably paler, and with the fasciæ less distinct, the lobe, which is black, smaller, as is also the black spot between the lower median nervules. Abdomen brown above, yellowish below, with a tuft of buff-coloured hair at its extremity.

♀. Upperside uniform dull brown without any cupreous gloss. Underside as ♂.

Expanse, ♂  $1\frac{3}{10}$ , ♀  $1\frac{1}{10}$  inch.

Kina Balu (*Waterstr.*); Sandakan (*Pryer*).

This dull-coloured species appears to be distinct from any I can find described. It has a less robust appearance than any others of the genus. The male is in Dr. Staudinger's collection, the female in Messrs. Godman and Salvin's.

RAPALA DRASMOS, sp. n. (Plate XXXIV. fig. 13 ♀.)

♀. Upperside rich dark brown, shining, with the disc of the fore wing brownish orange (much the colour of *R. jarbas*, Fab., ♀, but paler), crossed by brown nervules. The nervules also of the hind wing are a darker shade of colour than the rest of the wing. Lobe pale orange with a black spot. Underside somewhat paler than is usual in *R. xenophon*, Fab., and with the fasciæ broader, straighter, and more distinct.

Expanse  $1\frac{3}{10}$  inch.

Labuan (*Waterstr.*). Type Mus. Staud.

Dr. Staudinger has sent me a single female of this species. It should be easily recognized by the coloured disc of the fore wing. I have not seen the male.

RAPALA DOMITIA.

*Deudorix domitia*, Hew. Ill. Diurn. Lep., *Lyc.* p. 19, pl. vi. figs. 6, 7 (1863).

*Deudorix domitia*, Druce, P. Z. S. 1873, p. 353.

Labuan (*Low and Waterstr.*).

Dr. Staudinger possesses a male which has the dash in the cell pale yellow dusted with brown; the costal margin and anal fold of hind wing also are broadly pale yellow, and the apex of the fore wing is dusted with white scales. The underside is very pale, scarcely darker along the inner margin on the fore wing. The sexual patch on the hind wing, which in all other species of *Rapala* that I have examined is large and conspicuous, is in *R. domitia* small, elongate, close to the subcostal nervure, and difficult to see, thereby approaching the genus *Deudorix*.

## BINDAHARA, Moore.

## BINDAHARA PHOCAS.

*Sithon phocides*, Fab., var. *phocas*, Staud. Iris, ii. p. 114 (1889).

*Sithon sugriva*, Druce (nec Horsf.), P. Z. S. 1873, p. 351.

Labuan (*Low and Waterstr.*).

Dr. Staudinger has sent me his type, male, for examination, and I find that Bornean specimens are identical with it. *B. phocas* is perhaps nearest to *B. isabella*, Feld., but the hind wing is less produced apically, and the cyaneous patch extends down to the first median nervule, and besides the black spot in the lobe there is usually a rather large black spot in the first median interspace close to the margin. The female on the upperside is rich cupreous, and on the underside the bands and spots are pale reddish brown. It is as much worthy of specific distinction as any other species in the genus. Messrs. Godman and Salvin's collection contains *B. phocas* from Celebes and from the Philippine Islands.

## SINTHUSA, Moore.

## SINTHUSA NASAKA.

*Thecla nasaka*, Horsf. Cat. Lep. E. I. C. p. 91 (1829).

*Hypolycaena terna*, Staud. MS.

Kina Balu (*Waterstr.*).

Dr. Staudinger has sent both sexes from Kina Balu, the male being identical with Horsfield's type in the British Museum. I quite fail to see how *S. amba*, Kirby, can be distinguished from *S. nasaka*, and in my opinion should be placed as a synonym of it. Mr. Doherty (J. A. S. B. vol. lviii. 1889) has possibly mistaken the next species (*S. amata*) for *S. nasaka*, as the whole of the hind wing of that species, except the basal portion of the costal margin, is cyaneous.

## SINTHUSA AMBA.

*Hypolycaena amba*, Kirby (Hew.), Ill. Diurn. Lep., *Lyc.* Supp. p. 32, pl. v. b. figs. 44-46 (1878).

*Sinthusa amba*, Distant & Pryer, Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 268 (1887).

Sandakan (*Pryer*).

Included here only on the authority of Messrs. Distant and Pryer.

## SINTHUSA AMATA.

*Sinthusa amata*, Dist. Rhop. Malay. p. 461, pl. xlv. fig. 20, ♀.

♂. Upperside differs from *S. nasaka* ♂ by being less densely black, by the purple area of the fore wing being duller and less extensive, by the blue of the hind wing, which is sharply bordered by the subcostal nervure, being paler and of a decided violaceous shade, and not resplendent when held at an angle. The hairs which

are thickly strewn on the median interspaces are white, those in *S. nasaka* being black. Underside as ♀, but apex of fore wing more greyish ochreous.

Kina Balu (*Waterst.*). Mus. Staud. and Druce.

The females before me appear to agree perfectly with Mr. Distant's description and figure; and as the male is undoubtedly distinct from *S. nasaka*, I have described it here, feeling sure that I have correctly identified the species.

### LIPHYRA, Westw.

LIPHYRA BRASSOLIS, Westw.

*Liphyra brassolis*, Westw. P. Ent. Soc. ser. 3, vol. ii. p. 31 (1864).

Sarawak (*Hew.*).

The Hewitson collection contains a specimen of this species labelled "Sarawak."

### EXPLANATION OF THE PLATES.

#### PLATE XXXI.

- Fig. 1. *Paragerydus waterstradti*,  
sp. n., ♂, p. 562.  
2. ———, ♀, p. 562.  
3. *Gerydus gigas*, sp. n., ♂,  
p. 559.  
4. — *innocens*, sp. n., ♂,  
p. 560.  
5. *Paragerydus moorei*, sp. n., ♂,  
p. 562.  
6. ———, ♀, p. 562.  
7. — *caudatus*, Grose Smith,  
♂, p. 563.  
8. ———, ♀, p. 563.  
9. *Gerydus vincula*, sp. n., ♂,  
p. 561.

- Fig. 10. *Gerydus vincula*, sp. n., ♀,  
p. 561.  
11. *Allotinus audax*, sp. n., ♂,  
p. 564.  
12. ———, ♀, p. 564.  
13. *Logania staudingeri*, sp. n.,  
♂, p. 565.  
14. ———, ♀, p. 565.  
15. *Poritia phaluke*, sp. n., ♂,  
p. 567.  
16. — *phormedon*, sp. n., ♂,  
p. 566.  
17. ———, ♀, p. 566.  
18. — *phama*, sp. n., ♂,  
p. 568.

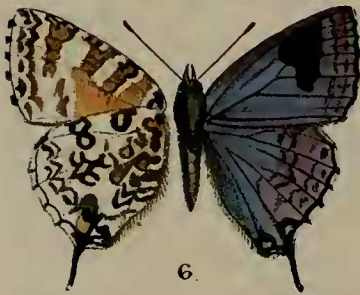
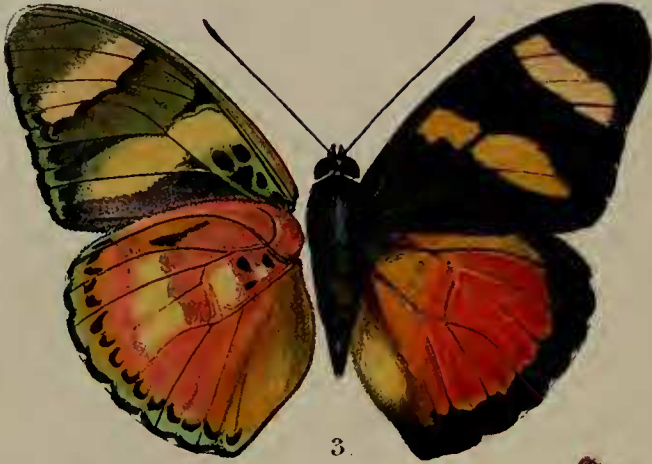
#### PLATE XXXII.

- Fig. 1. *Poritia philura*, sp. n., ♂,  
p. 569.  
2. *Cyaniris dilectissima*, sp. n.,  
♂, p. 571.  
3. ———, ♀, p. 571.  
4. — *strophis*, sp. n., ♂, p. 573.  
5. — *lugra*, sp. n., ♂, p. 573.  
6. — *placidula*, sp. n., ♂,  
p. 572.  
7. ———, ♀, p. 572.  
8. — *plauta*, sp. n., ♂, p. 574.  
9. ———, ♀, p. 574.  
10. — *selma*, sp. n., ♂, p. 573.  
11. — *ripte*, sp. n., ♂, p. 574.  
12. *Niphanda reter*, sp. n., ♂,  
p. 576.

- Fig. 13. *Næcaduba aluta*, Druce, ♂,  
p. 578.  
14. ———, ♀, p. 578.  
15. — *lugine*, sp. n., ♂, p. 577.  
16. *Lampides limes*, sp. n., ♂,  
p. 581.  
17. — *virgulatus*, sp. n., ♂,  
p. 581.  
18. — *zebra*, sp. n., ♂, p. 583.  
19. — *cærulea*, Druce, ♀,  
p. 582.  
20. — *lividus*, sp. n., ♂,  
p. 584.  
21. *Tarucus waterstradti*, sp. n.,  
♀, p. 585.







## PLATE XXXIII.

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| <p>Fig. 1. <i>Iraota nila</i>, Dist., ♂, p. 588.<br/>         2. <i>Arrhenothrix lowii</i>, sp. n.,<br/>         ♂, p. 596.<br/>         3. <i>Pratapa lucidus</i>, sp. n., ♂,<br/>         p. 596.<br/>         4. — <i>devana</i>, sp. n., ♂.<br/>         p. 597.<br/>         5. — —, ♀, p. 597.<br/>         6. — <i>calculus</i>, sp. n., ♂,<br/>         p. 598.<br/>         7. — —, ♀, p. 598.<br/>         8. <i>Tajuria tussis</i>, sp. n., ♂,<br/>         p. 601.<br/>         9. — —, ♀, p. 601.</p> | <p>Fig. 10. <i>Tajuria cyrus</i>, sp. n., ♂,<br/>         p. 600.<br/>         11. — —, ♀, p. 600.<br/>         12. — <i>dominus</i>, sp. n., ♂,<br/>         p. 600.<br/>         13. — <i>cato</i>, sp. n., ♂, p. 601.<br/>         14. — —, ♀, p. 601.<br/>         15. <i>Pratapa sannio</i>, sp. n., ♂,<br/>         p. 596.<br/>         16. <i>Hypolycæna skapane</i>, sp. n.,<br/>         ♂, p. 604.<br/>         17. — —, ♀, p. 604.<br/>         18. — <i>phemis</i>, sp. n., ♂,<br/>         p. 604.</p> |
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## PLATE XXXIV.

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| <p>Fig. 1. <i>Chliaria mimima</i>, sp. n., ♂,<br/>         p. 605.<br/>         2. <i>Biduanda thenia</i>, sp. n., ♀,<br/>         p. 614.<br/>         3. <i>Jacoona jusana</i>, sp. n., ♂,<br/>         p. 609.<br/>         4. — <i>metasuja</i>, sp. n., ♂,<br/>         p. 609.<br/>         5. <i>Biduanda staudingeri</i>, sp. n.,<br/>         ♂, p. 615.<br/>         6. — —, ♀, p. 615.<br/>         7. <i>Marmessus surindra</i>, sp. n.,<br/>         ♂, p. 617.<br/>         8. <i>Horaga corniculum</i>, sp. n.,<br/>         p. 611.<br/>         9. — <i>affinis</i>, sp. n., ♂, p. 611.</p> | <p>Fig. 10. <i>Deudorix staudingeri</i>, sp. n.,<br/>         ♂, p. 621.<br/>         11. <i>Rapala barthema</i>, Dist., ♂,<br/>         p. 623.<br/>         12. — <i>laima</i>, sp. n., ♂, p. 624.<br/>         13. — <i>drasmos</i>, sp. n., ♀,<br/>         p. 624.<br/>         14. <i>Poritia phare</i>, sp. n., ♂,<br/>         p. 567.<br/>         15. <i>Poriskina phakos</i>, sp. n.,<br/>         ♂, p. 570.<br/>         16. <i>Rapala olivia</i>, sp. n., ♂,<br/>         p. 622.<br/>         17. <i>Cyaniris phuste</i>, sp. n., ♂,<br/>         p. 573.</p> |
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5. On a small Collection of Butterflies sent by Mr. Richard Crawshay from the country west of Lake Nyasa. By ARTHUR G. BUTLER, Ph.D., F.L.S., F.Z.S., &c., Assistant-Keeper of the Zoological Department, British Museum.

[Received June 12, 1895.]

(Plate XXXV.)

The present consignment was forwarded to me by Mr. Sclater early in the present year; although very small, it is decidedly interesting, and the specimens, with only one or two exceptions, are in the admirable condition characteristic of Mr. Crawshay's collections. Five new species are now described.

The following extract from a letter to our Secretary evidences the careful and methodical manner in which Mr. Crawshay collects:—

“The collection I send is a very small one, made in Nyika chiefly,  
 40\*

two days west from here (Deep Bay, Lake Nyasa). Some few of the specimens I send should prove new on account of the high altitude from which they come. Several are from an altitude of 7000 feet or so, the highest plateau-land (Mlanji Mountain excepted) anywhere in B. C. Africa, I fancy. I have numbered each species in its paper, and have given as well (in brackets) the number of the individual specimens of each, locality, date of capture, and some rough distinguishing name for my own guidance. A few notes on what seem to me the most interesting insects may be of use."

These notes I propose to quote under the species to which they refer, as thereby no confusion can by any possibility arise.

The *Danaïnae* and *Satyrinae* are unrepresented in the present little series.

### 1. JUNONIA TUGELA.

*Precis tugela*, Trimen, S. Afr. Butt. p. 241, pl. iv. fig. 5.

♀. Foot of Nyika Plateau, west of Lake Nyasa, Sept. 6th, 1893. "Tortoiseshell" (*R. C.*).

When describing the allied *J. aurorina*, I compared it with *J. sinuata*; it is, however, more nearly related to *J. kowari* from the Cameroons, differing in the narrower truncated (not falcated) apex of the primaries, and longer, more tapering secondaries, in the tawny markings in the cell of primaries, the much narrower discal belt, which is distinctly paler, much less red, and less suffused with pink, also in the deep incision in this band formed by the strong and prominent angulation of the brown basal area of the anterior wings. Comparing our four examples with the four specimens of *J. kowari* in the Hewitson collection, I find all these characters absolutely constant.

### 2. PYRAMEIS CARDUI.

*Papilio cardui*, Linnæus, Faun. Suec. p. 276 (1761).

♂, Kantorongondo Mountain, Nyika, west of Lake Nyasa, Sept. 18th, 1893. "Painted Lady" (*R. C.*).

### 3. EUPHÆDRA CRAWSHAYI, sp. n. (Plate XXXV. fig. 3.)

♂. Allied to *E. zaddachii* and *E. elephantina*, but differing from both in the broader and more regular ochreous bands on the primaries, with other characters to be described: primaries greenish black, glossed with bright green at base; an oblique broad ochreous trifid band just before the middle, from subcostal vein to middle of interno-median areole, a second oblique quadrifid band (pale pinky ochreous or flesh-coloured) limiting the apical area, and of nearly uniform width throughout; fringe flecked and tipped with white: secondaries greenish black at base, costal border purplish slate-colour; subcostal area ochraceous; discoidal cell, almost to extremity, veins, and basal half of interno-median area bright golden ochreous; abdominal border pale ochreous brownish or testaceous, shading into smoky brown at anal angle;

disc of wing rosy blood-red, with diffused ochreous external edge; external border jet-black, with white spots on the fringe at extremity of internervular folds: body blackish; eyes coppery bronze, varied with blue-black; head deep brown, with two white spots before and behind; pterygodes and front of thorax bronze-green, sides of thorax clothed with copper-brown hair; base of abdomen hairy, shot with blue and green. Below differing from *E. zaddachii* in the regular creamy bands of the primaries, the inner edge of the subapical band slightly concave, instead of elbowed, the lower half of the first band not incised internally; a large yellow patch filling the end of the cell of secondaries, and a still larger patch or abbreviated band beyond the cell, commencing at subcostal vein in an elongated subpyriform patch, the inferior portion of which is occupied by an acutely angled, almost  $\Gamma$ -shaped streak; from the first subcostal to the third median nervule the band is of a clearer yellow and gradually widens, its inner edge being unequally trisinuated and not accompanied by black spots; the submarginal spots are uniformly smaller than in *E. zaddachii*, but the remaining characters are similar. Expanse of wings 80 millim.

♂, Lumpi River, Nyika, west of Lake Nyasa, Sept. 19th, 1893. "Cream, velvet, and crimson" (*R. C.*).

#### 4. METACRENIS ROSA.

♀. *Crenis rosa*, Hewitson, Ent Month. Mag. xiv. p. 82 (1877).

♂. *Crenis pechuelii*, Dewitz, Nov. Act. Acad. Nat. Cur. vol. xli. pl. xxvi. fig. 1 (1879).

♂, Deep Bay, 1500 feet altitude, west of Lake Nyasa, March 4th, 1894. "Violet Fritillary" (*R. C.*).

Mr. Crawshay says of this species:—"I have only seen three, during a year's residence here in 1893 and 1894, and long stays in previous years. It is of swift flight, and very difficult to catch, as it perches on trees, high up, out of one's reach as a rule. I at first took this insect for another which I got at Mweru, and which Mr. Butler was kind enough to name after me—viz., *Crenis crawshayi*; but, on closer examination, I see it is not the same except in general tone of colour."

#### 5. ARGYNNIS SMARAGDIFERA, sp. n. (Plate XXXV. figs. 1, 2.)

♂. Intermediate in character between *A. lathonia* and *A. euphrosyne*; size, form, and general pattern of the upper surface of the latter, but the base of the wings with the basal area broadly greyish green, the marginal spots of the primaries pale yellowish towards apex, and the centre of the secondaries spotted almost as in *A. lathonia*: wings below perfectly intermediate between these two very distinct species, the ground-colour of the apex of the primaries being characteristic of *A. euphrosyne*, clear yellow with similar ferruginous patches; the greater portion of the primaries, however, is of a dull tawny hue; the subbasal **D**-shaped black marking in the

cell encloses a shining green spot; the silver markings on all the wings are arranged nearly as in *A. lathonia*, but are much more uniform in size; the characteristic oblong spot beyond the cell of secondaries is larger than that in *A. euphrosyne*, but smaller than that in *A. lathonia*. Expanse of wings 46 millim.

Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Silver-speckled Fritillary" (*R. C.*).

Mr. Crawshay has the following note on this butterfly:—"No. 1 I took at the very summit of Kasungu Mountain, on open downland, covered with short, crisp, curly grass, only about ankle-high, I don't think I saw more than three, two of which I took (one I have by me). It is an exceedingly restless insect, of erratic flight, and, when on the wing, is a bad colour to follow with the eye. I did not find it anywhere but on the very top of the mountain; 100 feet or so lower down I did not see one."

#### 6. *ACRÆA EXCELSIOR*.

*Acræa excelsior*, E. M. Sharpe, P. Z. S. 1891, p. 192, pl. xvii. fig. 3.

♂, Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Small Red-barred Fritillary" (*R. C.*).

Of this insect Mr. Crawshay says:—"A little Fritillary from nearly the top of Kasungu may prove good. I saw only one, which I took in the same place as the great Blue No. 2."

Although the *Acræinæ* somewhat remind one of Fritillaries, they belong to a different subfamily.

#### 7. *POLYOMMATUS BÆTICUS*.

*Papilio bœticus*, Linnæus, Syst. Nat. i. 2, p. 789 (1767).

♀, Kantorongondo Mountain, Nyika, west of Lake Nyasa, Sept. 5th, 1893. "Blue" (*R. C.*).

It is almost impossible to get a collection from any part of the Old World which does not contain an example of this species and *Pyrameis cardui*.

#### 8. *LYCÆNESTHES* (sp. near *L. liodes*).

♀, Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Dull-marked Blue" (*R. C.*).

This species has almost exactly the same pattern as *L. liodes*, but the secondaries are elongated and with an abrupt elbow close to anal angle; although probably new, the single specimen is unfortunately a good deal injured.

#### 9. *ZIZERA UNIGEMMATA*, sp. n. (Plate XXXV. figs. 4, 5.)

♂. Allied to *Z. lysimon*: above smoky grey-brown, with faint lilacine gloss; a slender blackish marginal line: secondaries with a submarginal black spot with paler diffused edging; slightly orange at the back near extremity of first median interspace; fringes smoky greyish, darker on the primaries than the secondaries,

with blackish subbasal line followed by a whitish stripe: body blackish. Under surface mouse-grey, with markings somewhat as in *Z. lysimon*, but the primaries with pale-edged black reniform discocellular spot; discal series consisting of five whitish-edged conspicuous black spots, the interno-median area being crossed by two white lunules, to represent the lower spots of *Z. lysimon*; submarginal and marginal markings normal: secondaries with only three nearly equidistant subbasal pale-edged black spots, and only the first spot of the discal series black, but in the submarginal series the sixth spot is centred with a black spot edged with metallic blue. Expanse of wings 23 millim.

♂, Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Tiny Blue" (*R. C.*).

#### 10. SCOLITANTIDES STELLATA ?

*Lycena stellata*, Trimen, Trans. Ent. Soc. 1883, p. 349.

Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Tiny dull Blue" (*R. C.*).

#### 11. ZEBITIS HARPAX.

♀: *Papilio harpax*, Fabricius, Syst. Ent. App. p. 829 (1775).

♀, Deep Bay, 1500 feet altitude, west of Lake Nyasa, March 11th, 1894. "Large Copper ♀, with emerald-green legs" (*R. C.*).

An unusually large example, and redder underneath than in the majority of specimens.

#### URANOTHAUMA, gen. nov.

Allied to *Spindasis* and *Hyreus*: primaries with four subcostal branches, the first emitted from halfway to end of discoidal cell, anastomosing with costal vein, the second at one-third distance from end of cell, the third from halfway between cell and apex, the fourth running to just before the apex: secondaries with one rather long tail near anal angle; costal margin slightly sinuous; neuration quite normal: abdominal half of wings below clothed with long hairs; abdominal margin densely hairy; eyes, pectus, and legs to end of femora densely hairy. Male with a large velvety black patch on the upper surface of the primaries immediately beyond the cell.

Typical species, with the anal angle lobed and the tail emitted from a second more prominent lobe: *U. crawshayi*.

This genus will include *Hyreus cordatus*, E. M. Sharpe, from Sotik, Kavirondo.

#### 12. URANOTHAUMA CRAWSHAYI, sp. n. (Plate XXXV. figs. 6, 7.)

♂. Rufous brown, shot with bright violet, excepting on the costal and abdominal borders of the secondaries; fringes white, spotted with black at the extremity of the veins, most heavily on the primaries; a large velvety black patch beyond the cell of these

wings, having on the left-hand wing somewhat the outline of the letter **P**; fringe of abdominal margin of secondaries sordid white; two black submarginal spots above the anal lobes, that above the tailed lobe large and enclosing a conspicuous metallic ultramarine transverse spot, that above the inner lobe partly enclosing a metallic golden-green spot, tinted along its upper edge with blue; tail black, tipped with white: body blackish, clothed in front with slaty-grey hairs, behind, but especially at the sides, with silvery brownish hairs, abdominal segments very slenderly edged with whitish; antennæ black, slenderly ringed with white to the base of the clavus; palpi long, black with a white lateral stripe, the broad fringes formed of mixed white and black hairs; pectus and venter white; legs white, barred with black. Wings below chalky white: primaries with an **8**-shaped black basal patch (which in the female becomes a **3**), three clay-reddish bands commencing in partly blackish annular markings on the costa, uniting into a broad argillaceous patch below the cell; all the other markings very nearly as in *U. cordatum*, Sharpe, but much heavier in character, the fourth band of the primaries being also continued across these wings by the addition of two argillaceous spots almost touching the outer edge of the patch of that colour; the black spot above the tail of secondaries united on its outer edge to a metallic tricoloured **U**-shaped patch, the projecting parts of which are blue, and the enclosed portion fiery copper, shading at the edges into green; anal spot edged on one side by an oblique blue and copper dash. Expanse of wings 42 millim.

♀ slightly larger, more rufous, almost argillaceous, the primaries with the whole surface, excepting the costal and external areas, brilliant *Morpho*-blue; a transverse narrow **8**-shaped bar across the cell, a quadrate patch at the end of the cell, a series of six subconfluent spots across the disc, interrupted at second median nervule, and the outer border black: secondaries with an annular series of blackish spots as follows—two closing the cell, three in a curved series beyond the cell, and one near the base of the subcostal areole; a few other spots vaguely showing through from the under surface; margin of wing blackish; fringes, metallic spots, tails, and pattern of under surface as in the male. Expanse of wings 45 millim.

Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Giant Blue" (*R. C.*).

Mr. Crawshay has the following note on this lovely species:—  
 "No. 2 is a Blue, also from Kasungu, and from nearly the top of the mountain. It seems fairly plentiful, at least I saw perhaps ten or a dozen, of which I took four. It is of rapid, buzzing, humming-bird, moth-like flight, and feeds restlessly, hovering almost the whole time. The sunny side of flowering trees and shrubs is its favourite haunt; as long as the sun is bright it is very restless and active. It is a Blue, and yet does not feed in the deliberate way in which the majority of Blues feed; its wings are never at rest."

13. *COLIAS EDUSA*, var. *ELECTRA*.

*Papilio electra*, Linnæus, Syst. Nat. i. 2, p. 764 (1767).

♂ ♂ and ♀ (*C. helice* type), Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893.

♀ ♀ (both forms), Kantorongondo Mountain, Nyika, Sept. 18th, 1893. "Clouded Yellow and Pale Clouded Yellow" (*R. C.*).

Mr. Crawshay remarks:—"The Clouded Yellows do not differ in their habits from those I have taken in Great Britain. I got them all, with the exception of one, on the top of Kasungu. They are the first Clouded Yellows I have come across in B. C. Africa.

"The Pale Clouded Yellow, or whatever it is, may prove something good. The Dark Clouded Yellows, as far as I can judge, are merely small editions of the British *Colias edusa*.

"Of the Pale Clouded Yellows, I took two specimens (one I have). I took four specimens of the Dark Clouded Yellow, and could have taken more."

The "Pale Clouded Yellow" is only the usual albino form of the female; Mr. Crawshay sent us *two* specimens. One of the males does not differ in any respect from typical *C. edusa*; the other and the ordinary female are somewhat more yellow in tint, especially on the posterior wings, those of the female showing scarcely a trace of the usual orange suffusion.

14. *TERIAS PUNCTINOTATA*, sp. n. (Plate XXXV. figs. 8, 9.)

♀. Evidently a representative or geographical race of *T. desjardinsii*, from the female of which it differs in the total absence of the dark brown border of the primaries—all the wings above being uniformly primrose-yellow, paler towards the outer margins, and with brown-stained black dots at the extremities of the veins; on the under surface the reddish border and apical oblique streak of the primaries are wanting, and the subapical bilunate marking is dark ferruginous brown; the ground-colour is also paler. Expanse of wings 41–45 millim.

♀ ♀, Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, and Kantorongondo Mountain, Sept. 5th, 1893. "Brimstone (small)" (*R. C.*).

Speaking of the reduction in the width of the border in females of *T. desjardinsii*, Mr. Trimen says:—"Here the extreme of reduction breaks up the hind-marginal portion of the border into very nearly separated spots." Between this extreme and *T. punctinotata* there is a very considerable gap, but it may eventually be bridged over when the fauna of Africa is thoroughly known.

15. *PAPILIO PSEUDONIREUS*, var. ?

*Papilio pseudonireus*, Felder, Reise der Nov., Lep. i. p. 94.

Above this example is black, with all the markings of a satiny Antwerp Blue, the fringes narrowly white between the veins: on the upper surface the central band is evidently wider than in



Felder's type; but the same submarginal dots in pairs occur on the primaries: on the under surface there is one marked difference, the primaries show a discal series of divided spots, the first four, from inner margin to lower radial, white, the fifth whitish, but indistinct, the remainder forming a blurred greyish band to costa; in the silvery white band of the secondaries and all other respects the specimen agrees with Felder's description; and knowing how much the allied *P. nireus* varies, I think it would be rash at present to regard this as a distinct species.

♂, Kasungu Mountain, Nyika, West of Lake Nyasa, Sept. 2nd, 1893. "Blue Swallow-tail" (*R. C.*).

Mr. Crawshay says:—"This is, I suppose, a Swallow-tail of sorts, or what an expert would call a *Papilio*? It is not a difficult insect to take, as it flops along lazily, and before perching hesitates a good deal. I found it only on the top of Kasungu, and saw three in all, of which I secured two."

Later on, we may perhaps receive other examples of this form, when it will be possible to decide whether the differences between it and typical *P. pseudonireus* are constant.

#### 16. PAPILIO HORRIBILIS.

*Papilio horribilis*, Butler, Lep. Exot. p. 88, pl. xxxiv. fig. 2 (1872).

♂, Northern Henga, west of Lake Nyasa, Jan. 25th, 1894. "Chocolate Swallow-tail" (*R. C.*).

Of this species Mr. Crawshay writes:—"Taken in Henga, at about 3300 feet. I saw only one. It kept flying up and down a small stream with high banks, and gave me a lot of trouble to catch. My caravan was delayed on its account for the better part of half an hour."

#### 17. PADRAONA WATSONI.

*Padraona watsoni*, Butler, P. Z. S. 1893, p. 671.

♂, Kantorongondo Mountain, Nyika, west of Lake Nyasa, Sept. 18th, 1893. "Orange-and-Black Skipper" (*R. C.*).

#### 18. GEGENES LETTERSTEDTI.

*Hesperia letterstedti*, Wallengren, Kongl. Svensk. Vet.-Akad. Handl. 1857; Lep. Rhop. Caffr. p. 49.

♂, Kasungu Mountain, Nyika, west of Lake Nyasa, Sept. 2nd, 1893. "Greenish Skipper" (*R. C.*).

### EXPLANATION OF PLATE XXXV.

Figs. 1, 2. *Argynnis smaragdifera*, p. 629.

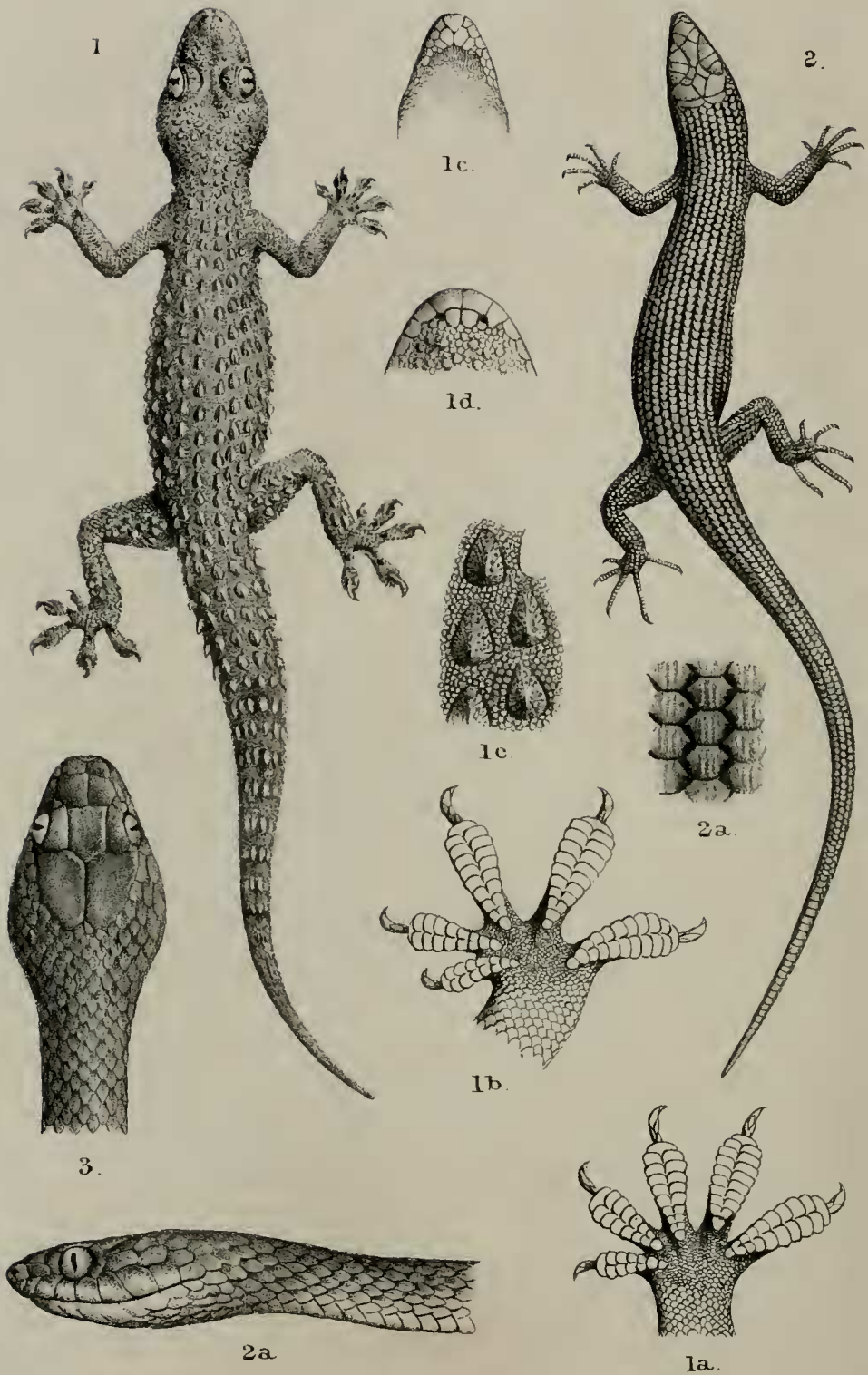
3. *Euphædra crawshayi*, p. 628.

4, 5. *Zizera unigemmata*, p. 630.

6, 7. *Uranothauma crawshayi*, ♂ ♀, p. 631.

8, 9. *Terias punctinotata*, ♀, p. 633.





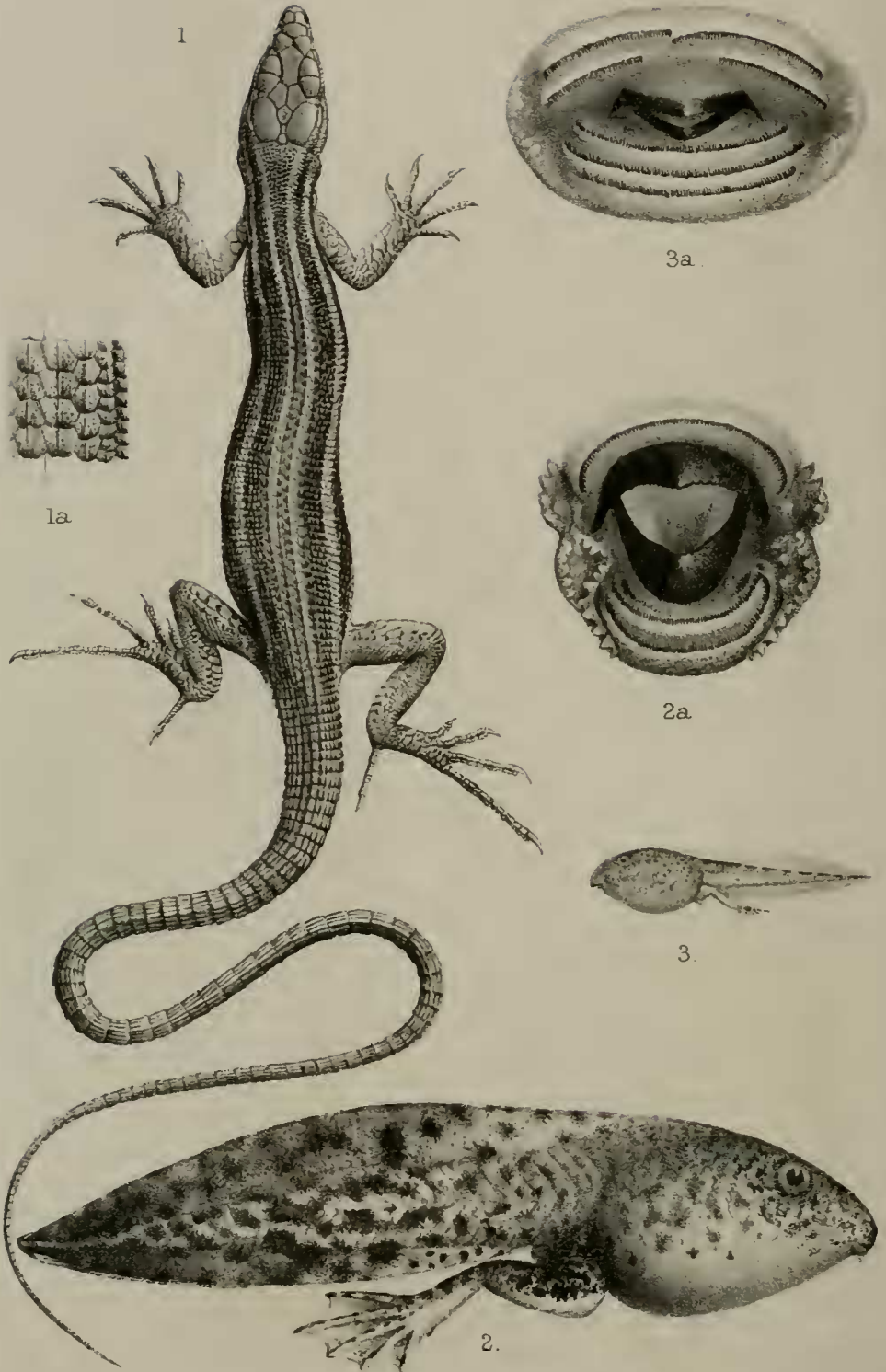
H. Grönvold del. et lith.

Mintern Bros imp.

1. *HEMIDACTYLUS VERBURII*. Andr. 2. *MABUIA TESSELLATA*. Andr.

3. *TARBOPHIS GUENTHERI*. Andr.





H Grönvold del et lith.

Mintern Bros. imp.

1. *LATASTIA NEUMANNI*, Matschie. 2. *RANA CYANOPHLYCTIS*, Schneider.  
3. *BUFO ANDERSONI*, Boulenger.

6. On a Collection of Reptiles and Batrachians made by Colonel Yerbury at Aden and its Neighbourhood. By JOHN ANDERSON, M.D., LL.D., F.R.S., F.Z.S.

[Received June 18, 1895.]

(Plates XXXVI. & XXXVII.)

Colonel Yerbury has presented this collection to the British Museum, and I have to express my indebtedness to Dr. Günther for having entrusted its description to me, and also to Mr. Boulenger for his assistance and advice. It contains examples of 17 species of Lizards, 5 Snakes, and 3 Batrachians.

The specimens were collected at the following localities besides Aden itself, viz.: Shaikh Othman, five or six miles inland; the oasis of Lahej, 20 miles from Aden; and Haithalhim, 25 miles distant from the rock.

Considering that Aden has been in the possession of this country since 1839, it is rather remarkable that we are only now beginning to know something about its fauna, and very slow progress seems to attend the elucidation of its flora<sup>1</sup>. The literature bearing on its Reptiles and Batrachia can be summarized in a few words.

In Mr. Boulenger's Catalogue of the Lizards in the British Museum, only *Pristurus crucifer*, Val., and *Chamoleon calcarifer*, Peters, are recorded with Aden as a locality, and in the first volume of Snakes the only species mentioned from Aden is *Zamenis rhodorhachis*, Jan.

Professor Boettger<sup>2</sup>, in 1892, recorded the occurrence of *Gymnodactylus scaber*, Heyden, *Hemidactylus coctæi*, Dum. & Bibr. = *H. flaviviridis*, Rüppell, *Scincus hemprichii*, Wieg., *Chalcides ocellatus*, Forskål, *Zamenis ladaensis*, Andr. = *R. rhodorhachis*, Jan, and *Echis carinata*, Schneider; and in the following year Herr Matschie<sup>3</sup> added six other species, collected by Mr. Oscar Neumann, to those already known, viz.:—*Mabuia pulchra*, Matschie, = *M. brevicollis*, Wieg., *Acanthodactylus boskianus*, Daud., *Philochortus neumanni*, Matschie, = *Latastia neumanni*, Matschie, *Lytorhynchus diadema*, D. & B., *Bufo arabicus*, Rüpp. (? = *Bufo pentoni*, Andr.), and *Rana ehrenbergi*, Peters, = *Rana cyanophlyctis*, Schneider.

In Colonel Yerbury's collection there are specimens of 11 species of Reptiles new to the fauna of Aden and its neighbourhood, and one Toad. Of the former, three are new to science.

I am indebted to Colonel Yerbury for some interesting notes on the occurrence and habits of many of the species. I have indicated his observations by inverted commas.

<sup>1</sup> My brother wrote his 'Florula Adenensis' so long ago as 1856, and I am informed, on the best authority, that only very trifling additions have been made to it since.

<sup>2</sup> Ber. Offenb. Ver. 1892, pp. 61-63.      <sup>3</sup> SB. nat. Fr. 1893, pp. 27-31.

The following is a list of the Reptiles and Batrachia now known to occur in Aden and in the immediately surrounding country:—

## LACERTILIA.

## GECKONIDÆ.

1. *Ceramodactylus doriae*, Blanford. Aden.
2. *Gymnodactylus scaber*, Heyden. Aden (*Boettger*).
3. *Pristurus crucifer*, Val. Kursi near Aden (*Boulenger*).
4. ——— *flavipunctatus*, Rüppell. Aden; Lahej.
5. *Hemidactylus sinaitus*, Boulenger. Shaikh Othman; Lehaj.
6. ——— *yerburii*, n. sp. Aden; Lahej; Haithalhim.
7. ——— *flaviviridis*, Rüppell. Aden (*Boettger*); Shaikh Othman; Lahej.

## AGAMIDÆ.

8. *Agama sinaita*, Heyden. Haithalhim.

## VARANIDÆ.

9. *Varanus griseus*, Daud. Lahej; Haithalhim.

## LACERTIDÆ.

10. *Latastia neumanni*, Matschie. Scadi near Lahej (*Matschie*); on road between Lahej and Shaikh Othman.
11. *Acanthodactylus boskianus*, Daud. Scadi near Lahej (*Matschie*); Aden, outside isthmus; Shaikh Othman; Lahej; Haithalhim.
12. ——— *cantori*, Günther. Lahej.
13. *Eremias guttulata*, Licht. Lahej; Haithalhim.

## SCINCIDÆ.

14. *Mabuia brevicollis*, Wieg. Scadi near Lahej (*Matschie*); Shaikh Othman; Lahej; Haithalhim.
15. *Mabuia tessellata*, n. sp.
16. *Scincus hemprichi*, Wieg. Aden (*Boettger*); Shaikh Othman; Lahej?
17. *Chalcides (Gongylus) ocellatus*, Forskål. Lahej (*Matschie*); Aden (*Boettger*); Shaikh Othman.

## CHAMÆLEONTIDÆ.

18. *Chamæleon calcarifer*, Peters. Aden (*Boulenger*); Shaikh Othman; Lahej; Haithalhim and Huswah.

## OPHIDIA.

COLUBRIDÆ (*Aglypha*).

19. *Zamenis rhodorhachis*, Jan. Aden (*Boettger*).
20. *Lytorhynchus diadema*, D. & B. Lahej (*Matschie*).

## (Opisthoglypha.)

21. *Psammodphis lacrymans*, Reuss. Shaikh Othman; Haithalhim; Lahej.
22. *Cœlopeltis moilensis*, Reuss. Aden, sands outside isthmus.
23. *Tarbophis guentheri*, n. sp. Muscat; The Hadramaut (*Bent Expedition*); Lahej.

## VIPERIDÆ.

24. *Echis carinata*, Schneider. Aden (*Boettger*); Lahej.

## BATRACHIA.

## RANIDÆ.

1. *Rana cyanophlyctis*, Schneider. Lahej (*Matschie*); Haithalhim.

## BUFONIDÆ.

2. *Bufo pentoni*, Anderson. Lahej; Haithalhim.
3. ——— *andersoni*, Boulenger. Lahej.
- ? *Bufo arabicus*, Rüpp. Aden (*Matschie*).

The foregoing list is doubtless very imperfect, and it will be observed that it does not contain a single Chelonian, either from the land or water, and no marine snakes. Every section of the fauna of Aden is of extreme interest owing to the geographical position of the locality and its proximity to the African coast. The question whether any sea-snakes are found on the coast is one well worthy of the attention of any resident at Aden interested in the geographical distribution of animals. Sir Lambert Playfair informs me that he has never heard of them at Aden or anywhere in the Red Sea, but that he has seen them off the coast of Arabia, when going from Zanzibar to Bombay. They are unknown at the former locality. Colonel Yerbury says he has never met with a sea-snake at Aden, and that he does not believe that they exist there, or he would certainly have met with them when he was collecting marine shells and seining. Sea-snakes are common at Muscat, indeed they occur there rather in profusion. To what cause is their apparent absence at Aden to be attributed? If not entirely absent from the Aden sea they must be extremely rare, as many good observers have visited both sides of the Gulf and not a single instance of their occurrence has been recorded in zoological literature.

## LACERTILIA.

1. *CERAMODACTYLUS DORIÆ*, Blanford.

*Ceramodactylus doriæ*, Blanford, Ann. & Mag. N. H. (4) xiii. 1874, p. 454.

1 ♂.

This is the first record of the occurrence of this species at or



near Aden, but in the British Museum there are examples from Muscat<sup>1</sup>, from the Sinaitic peninsula, and one from Arabia<sup>2</sup> presented by the late Sir Richard Burton, and, therefore, probably from Midian.

## 2. PRISTURUS FLAVIPUNCTATUS, Rüppell.

*Pristurus flavipunctatus*, Rüppell, Neue Wirbelth. 1835, Rept. p. 17, pl. vi. fig. 3.

13 ♀. Aden: "common on the rocks."

4 ♂, 5 ♀. Lahej: "common on the trunks of babool trees."

In the British Museum there is a single example of this species from Shaikh Othman, presented by Marquis Doria. These specimens now prove the species to be distributed over the Aden district, where it appears to be quite as common as it is on the opposite African coast; but Colonel Yerbury informs me that it is extremely difficult to capture owing to the rapidity of its movements.

The spots which occur on the sides of this little Gecko of rocks and trees are rich blood-red in freshly preserved specimens. They are very minute, generally not larger than two granules, and are chiefly confined to the sides, from the axilla to the groin, and to the sides of the belly. The brilliancy of these spots induced me to examine them with a hand-lens, when I was surprised to find that many of the supposed coloured spots of the lizard were due not to skin-pigment but to the presence of a minute mite simulating their colour. I submitted a portion of the skin to the high authority of Mr. Albert D. Michael, who was so good as to examine it, and he informs me that the minute mite belongs to the genus *Gekobia*, and that it is either identical with, or very similar to, *G. loricata*, Berlese. Mr. Michael is disposed to think that it is identical, but says that there may be some minute differences which can only be detected by actual dissection, and, moreover, that it is difficult to compare spirit-specimens, which shrink, with Berlese's drawing made from life; he therefore leaves the question of the species in abeyance. Berlese's specimens were found, Mr. Michael informs me, "in a precisely similar situation under the scales of *Platydactylus muralis*" (*Tarentola mauritanica*, Linn.) "in South Italy."

In the males of these specimens the crest of the tail may be traced on to the sacral region, but not beyond it.

All the specimens from Aden and its neighbourhood are much paler in colour than those from the opposite African coast.

"This species is plentiful everywhere on the rocks in Aden, from the sea-level to the summit of Shum-Shum. I was at first under the impression that they basked in the hottest sunshine, but found afterwards that they almost entirely disappeared during the greatest heat of the day. Nevertheless, when they were moving

<sup>1</sup> Boulenger, Ann. & Mag. N. H. (5) xx. 1887, p. 407.

<sup>2</sup> Cat. Liz. B. M. 2nd ed. i. 1885, p. 14.

about, the rocks were so hot as to be unpleasant to the touch. I also found it in considerable numbers on the trunks of large babool trees about 4 miles on the Aden side of Lahej."

### 3. HEMIDACTYLUS SINAITUS, Boulenger.

*Hemidactylus sinaitus*, Boulenger, Cat. Liz. B. M. 2nd ed. i. 1885, p. 126.

1 ♂, 2 ♀, and 2 juv. Shaikh Othman.

1 ♀. Lahej.

This species was founded by Mr. Boulenger on a female from Mount Sinai. In it the nostril is formed by the rostral and by three nasals, the first labial being excluded from the nostril by the junction of the lowest nasal and the rostral<sup>1</sup>. In five of the specimens collected by Colonel Yerbury, the first labial enters the nostril by a fine point, whereas in one it enters the nostril on one side and is excluded on the other by the junction of the lowest nasal and the rostral, so that the formation of the nostril is subject to variation. In only 3 out of 24 specimens obtained by me on the African coast of the Red Sea (Suakin) does the first labial enter the nostril.

In the type of the species there are no transversely enlarged subcaudal plates. The specimen from Shaikh Othman, a ♀, agrees with it in this detail, whereas in one from Aden the subcaudals are slightly transversely enlarged, whilst, on the other hand, a male from the latter locality has a mesial line of transversely enlarged sub-caudals, a feature also present in two young specimens. It would thus appear that the definition of the species, so far as its subcaudals also are concerned, requires modification.

There are also in the type 9 upper and 8 lower labials, but in two adults from Aden and in the Shaikh Othman specimen the labials are as follows:— $\frac{8}{8}$ ,  $\frac{9}{7}$ ,  $\frac{11}{10}$ . The dorsal tubercles of the type are considerably smaller than those of *H. turcicus*; but in three Aden specimens they are even smaller than in the former, but not more so than might be expected to occur in specimens from localities so widely apart as Aden and Mount Sinai.

In the type there is a large chin-shield on each side of the mental, in contact with its fellow behind the latter, and in relation externally with the first and second labials. Behind it is a much smaller shield with some enlarged scales posterior to it. The chin-shields of the Aden specimens follow a similar arrangement, but with slight modifications.

The number of the lamellæ under the digits and the extent of their lateral development are important characters in the species of this genus. In these details the Aden Geckoes agree broadly with *H. sinaitus*, but, as in every other character, these features are subject to variation. The following are the numbers of lamellæ

<sup>1</sup> In the original description the rostral, instead of the first labial, is said not to enter the nostril, but the relation of these shields to the nostril in the type specimen is as stated above.

on the fore and hind feet of this species as illustrated by four specimens from Aden :—

	Digits					Digits					Digits					Digits				
	1.	2.	3.	4.	5.	1.	2.	3.	4.	5.	1.	2.	3.	4.	5.	1.	2.	3.	4.	5.
Fore limb .....	5	6	6	6	6	5	6	6	7	6	6	6	7	5	5	6	6	7	7	
Hind limb.....	5	7	8	10	7	5	7	7	9	7	6	6	7	9	7	5	7	7	9	8

The narrower and shorter digits, the fewer lamellæ, the smaller dorsal tubercles, and the exclusion generally of the first labial from the nostril are the features that distinguish *H. sinaitus* from *H. turcicus*.

The coloration of these Aden specimens is much paler than that of the type from Mount Sinai, and in this conforms to that generally distinctive of Geckoes from arid and desert localities. The general colour is pale olive-white, many of the tubercles being dark brown and others white. There is a broad brown band from the snout to the eye prolonged backwards along the side of the neck in a paler tint. The tail is more or less spotted with brown, the spots tending to form transverse bars. Underparts white.

This is the first record of the presence of this species in Arabia proper.

Measurements<sup>1</sup> of 4 specimens.

Sex.	Snout to vent.	Tail.	Width of head.	Length of head.	Length of fore limb.	Length of hind limb.
♀ . . . .	52	54	9	14·5	17·5	21
♀ . . . .	42·2	44·5	7·2	12	13·5	17
♀ . . . .	40	44	12	10·6	12·9	14·2
♂ . . . .	38	45	7	11	13·2	15

“ It was very plentiful under some old matting that had been thrown down in the so-called forest, or more properly garden, at Shaikh Othman. It was generally to be found under old logs and other objects lying on the ground.”

4. *HEMIDACTYLUS YERBURII*, n. sp. (Plate XXXVI. fig. 1.)

1 ♂. Lahej.

1 ♂. Haithalhim.

Snout moderately long, exceeding the distance between the posterior border of the eye and the ear, and somewhat spatulate in form. Eye large, its long diameter equalling half the distance between its anterior border and the snout. Ear crescentic, half the diameter of the eye. Nostril formed by the rostral, labial, and 3 nasals<sup>2</sup>. Body covered with minute flat rounded granules with numerous large strongly trihedral tubercles intermixed and arranged in sixteen more or less longitudinal series, and the head

<sup>1</sup> All measurements are in millimètres.

<sup>2</sup> On one side the first labial and lowest nasal are confluent.

more sparsely covered with enlarged convex granules. The granules of the head are largest between the eye and the nostril. A few enlarged tubercles on the radial portion of the fore limb, and numerous trihedral tubercles on the hind limb, with generally a few smaller tubercles at the bases of the fourth and fifth toes. On the tail the tubercles are larger than those on the body, acutely pointed and arranged in transverse series of six, each row separated from the one in front of and behind it by about 6 rows of granules. Scales on the under surface of the base of the tail small and imbricate, but a short way beyond the base the mesial scales are transversely enlarged, and further on become transverse plates. A pair of large chin-shields in contact behind the pentagonal mental and broadly in contact with the first and second lower labials; a small shield external to each chin-shield and in contact with the second and third labials, and a line of enlarged scales below the labials. Scales on the ventral surface about one fourth the size of the dorsal tubercles, cycloid and imbricate. Limbs well developed, the fore limb reaching the nostril or in advance of the snout; the hind limb falls short of the axilla. Digits well-developed, with broad lamellæ, seven to eight on the pollex, eight to ten on the second to the fourth finger, and ten or eleven on the fifth; seven or eight lamellæ on the hallux, nine to eleven on the second, third, and fourth toes, and eleven or twelve on the fifth. Tail much depressed at the base and throughout its entire length, longer than the body and head, and finely pointed. Femoral pores 12 to 15.

General colour grey, with an obscure dusky band before the eye and also behind it, with or without some feeble dusky markings on the head, neck, and shoulders; faint indications of dark bands on the middle of the tail towards the tip. Underparts white, minutely spotted with livid on the sides of the belly.

Sex.	Snout to vent.	Tail.	Width of head.	Length of head.	Length of fore limb.	Length of hind limb.
♂ . . . .	69	—	19·3	14·5	26·5	33
♂ . . . .	67	73·5	19	14	25·5	28·9

This species is distinguished from *H. turcicus*, Linn., by the greater development of its digits, but more especially of their lamellæ, which by their breadth recall those of a *Tarentola*. The greater development of its dorsal tubercles, the flattened tail, its heavier form, greater size, and uniform coloration are all features in which it differs from that species. Its chin-shields, also, in their relations to the upper labials differ from those of *H. turcicus*.

I have much pleasure in connecting Colonel Yerbury's name with this species. He informs me that he "saw this species once in Aden about halfway up Shum-Shum. The specimen was in a crevice of the rock, but it ran rapidly up the perpendicular face of the precipice when I tried to catch it. It is fairly common inland on the trunks of trees."

## 5. HEMIDACTYLUS FLAVIVIRIDIS, Rüppell.

*Hemidactylus flaviviridis*, Rüppell, Neue Wirbelth. 1835, Rept. p. 18, pl. vi. fig. 2.

*Hemidactylus coctæi*, D. & B. Erpét. Gén. iii. 1836, p. 365.

1 ♀. Aden.

Mr. Boulenger, in 1887, pointed out<sup>1</sup> that *H. flaviviridis*, Rüppell, is identical with *H. coctæi*, D. & B. While in Frankfurt-on-the-Main, two years ago, I examined the type of *H. flaviviridis*, Rüppell, and arrived at the same conclusion, being unaware at the time, however, of Mr. Boulenger's identification of the two.

As Duméril and Bibron quote Rüppell's 'Neue Wirbelthiere' in their third volume, it is evident that *H. flaviviridis* must stand for this widely distributed Gecko, which was first described from a Massowah specimen.

Of late years, it has been found at Korseir<sup>2</sup> and at Aden<sup>3</sup>. Specimens exist in the British Museum from the latter locality and also from Muscat<sup>4</sup>.

"This is the common house Gecko of Aden, Shaikh Othman, and Lahej, and is plentiful in these localities."

## 6. AGAMA SINAITA, Heyden.

*Agama sinaita*, Heyden, Rüpp. Atlas N. Afr. Rept. 1827, p. 10, pl. 3.

1 ♂, 3 ♀. Haithalhim.

This is the first notice of the occurrence of this species at Aden, but, so long ago as 1851, it was recorded by A. Duméril from the rocks at Muscat<sup>5</sup>. These Aden specimens agree exactly with examples in the British Museum from Mount Sinai, whence the species was originally described.

"Plentiful in the bed of the stream at Haithalhim. The bed was dry and consisted of pebbles of various sizes and sand, with small bushes here and there, chiefly *Dipterygium glaucum*."

## 7. VARANUS GRISEUS, Daud.

2 ♂. Lahej.

Mr. Boulenger<sup>6</sup> has recorded this species from Muscat, but this is the first notice of its occurrence at Aden.

"It seems to be rare, as I met with it only on three occasions. The first example was brought to me by a man who had been

<sup>1</sup> Cat. Liz. B. M. 2nd. ed. iii. p. 485.

<sup>2</sup> Klunzinger, Zeitsch. Gesell. f. Erd. Berlin, 1878, p. 94.

<sup>3</sup> Boettger, Bericht Offenb. Ver. Nat. 1892, p. 62; Matschie, SB. Gesell. nat. Fr. 1893, p. 29.

<sup>4</sup> Boulenger, Ann. & Mag. N. H. (5 ser.) xxi. 1887, p. 407.

<sup>5</sup> Cat. Méthod. Rept. 1851, p. 103.

<sup>6</sup> Ann. & Mag. N. H. (5 ser.) xxi. 1887, p. 407.

placed at my disposal, for the purpose of collecting, by the Sultan of Lahej, but this solitary specimen was the beginning and ending of his services. It was obtained in the neighbourhood of the babool trees mentioned in connection with *Pristurus flavipunctatus*. The second was received from a camel-driver who said he had killed it, at the door of his house, in Al Hantah, Lahej; and the third was seen among some thick bushes at Haithalhim."

In this species, but more so in *Varanus niloticus*, two slight eminences are occasionally present, in both sexes, immediately before the cloacal opening, occupying the position of the præanal pores of other lizards. The true nature of these structures in *V. griseus* is best seen by studying *Varanus niloticus*.

The pores of the body-scales of that species are very minute openings requiring the aid of a hand-lens to render them visible, but in front of the cloacal opening they decidedly increase in size, and one or more of them, always in the same spot, frequently becomes enlarged and functionally active in a way perfectly distinct from any of its fellows, as from it alone exudes a yellowish-red secretion. In front of the anus a distinct swollen eminence occurs on either side of the mesial line and in the centre of this swelling is placed the enlarged pore. When the red crust of the dry secretion is removed a distinct pit remains, and in one specimen there was clear evidence of this pit being made up from secondary cup-shaped depressions, their central walls of opposition having been absorbed, so that the pit had a quadrilobate appearance. The presence of a pair of eminences in this region suggests the probability that they are glandular in nature, and that, during their functional activity, one or more scale-pores become enlarged and perform the function of excretory orifices.

I direct attention to these structures in the *Varanidae*, as they suggest that undue importance should not be attached to the absence or presence of præanal pores in certain *Lacertilian* genera. As a further illustration of this I may mention that in the genus *Stenodactylus* two præanal pores, like those of *Ceramodactylus*, are absent or present, irrespective of sex, in the species generally known as *S. guttatus*, Cuv., but, as every herpetologist is aware, this genus has hitherto been regarded as devoid of these structures.

8. *LATASTIA NEUMANNI* (Matschie). (Plate XXXVII. fig. 1.)

*Philochortus neumanni*, Matschie, SB. Ges. naturf. Fr. Berlin, 1893, p. 30.

1 ♀. Lahej.

1 ♂. Lahej.

These two specimens so perfectly agree with Herr Matschie's description of the species, that there can be no question of their correct identification. The only example obtained by Herr Oscar Neumann measured 72 millim. from the snout to the vent; whereas

the larger of Col. Yerbury's specimens, which was caught in the same locality, has the head and body 81 millim. long. In the former, the tail is recorded as having been 127 millim., whereas in the latter it is 201 millim. in length. In the smaller of the above examples, with the head and body only 53 millim. long, the tail is 148 millim., *i. e.* nearly 2 centimètres longer than that of the type, which had its body and head almost 20 millim. in excess of the former. These differences in the proportion of the tail to the body and head between the type and Col. Yerbury's specimen are doubtless due, not to variation, but to the tail of the former having been renewed. In *Latastia* the renewal of the tail is not marked by any prominent line of demarcation, as occurs in many other genera of Lizards.

There are in all thirteen longitudinal bands along the body of this lizard, counting the dark band external to the ventrals. The middle of the enlarged dorsals is olive-brown with a narrow yellowish line external to it, followed by a broad blackish band, with a narrow white band external to it, succeeded by a still broader black band with a white band below it, and lastly the less well-defined black band along the external ventrals. The upper surface of the head is olive-brown, and the limbs and tail olive above, the former being more or less black-spotted. The underparts are white, with exception of the under surface of the tail which is yellowish. In the young the lineation is even more pronounced than in the adult and the black predominates, and the posterior three-fourths of the tail are yellow, passing into orange-red at the tip.

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.
♀ .....	81	201	17	10
♂ .....	53	148	12·3	9

Sex.	Length of fore limb.	Length of hind limb.	Femoral pores.	Scales round body.
♀ .....	28	49	16	42
♂ .....	20·5	36	14-15	47

The question arises whether *Philochortus* is distinct from *Latastia*, leaving for the present in abeyance the broader question whether *Latastia* is worthy of generic rank apart from *Lacerta*.

The first character of the new genus is the presence of a shield separating the interparietal from the occipital. Mr. Boulenger, however, has pointed out that a shield, in the same position, is not unfrequently present in *Latastia longicaudata*, Reuss, and my specimens from Suakin verify this and show, moreover, that the area around the interparietals and the occipital is the subject of variation, as portions become separated off from the former shields. In estimating, therefore, what value is to be attached to the presence of a small shield between the interparietal and occipital, such variations as the foregoing cannot be lost sight of, as they undoubtedly

minimize its importance and negative its value even as a specific character. Moreover, it is not confined to *Latastia*, as it is not unfrequent in *Lacerta*, *Eremias*, &c.

The next character of *Philochortus* is the small size of the præ-frontal suture, but this can hardly be accepted as of generic import, in view of the great variability of this suture among individuals of a species in almost every genus of the *Lacertidæ*.

The presence of a small partition separating the nostril from the first labial is not peculiar to *Philochortus*, as a similar structure exists in *Latastia*, but developed to a less extent, so that from a structural point of view, in this respect, the two nostrils are generically identical.

In the former, the nostril is between two shields, but in *Lacerta* and *Eremias* the nostril is formed by two and three, and by three and four shields respectively, and in *Latastia*, as defined by Mr. Boulenger, by two and three nasals, so that *Philochortus* is embraced by it.

In all its other details *Philochortus* resembles *Latastia*, so that there are no reasons why this Aden lizard should have generic rank conferred on it.

The *Lacerta spinalis*, Peters<sup>1</sup>, from Abyssinia is a form closely allied to *Latastia neumanni*, Matschie, with enlarged scales down the middle of its back, but nearly smooth instead of being strongly keeled. The two have the nuchal scales granular.

"The only two specimens of this lizard in the collection were taken on a camel-tract between Lahej and Shaikh Othman. It occurs on the same kind of ground as *Acanthodactylus boskianus*, and *A. cantoris*." Herr Oscar Neumann's specimen, however, was obtained at Lahej in very long grass, a circumstance that suggested the term *Philochortus* to Herr Matschie.

Since the foregoing remarks were written, Herr Neumann has visited London, and, in order that there should be no misunderstanding about the genus *Philochortus*, he wrote to Berlin for the type, and on its arrival he placed it at my disposal for comparison with Colonel Yerbury's specimens. This I have done, and with the result that the opinion I have expressed above requires in no way to be modified.

In Herr Neumann's lizard the little shield between the inter-parietal and the occipital is even less than in Colonel Yerbury's specimens.

The tail bears the mark of a cicatrix, which fully accounts for its shortness compared with the other Lahej specimens.

#### 9. ACANTHODACTYLUS BOSKIANUS, Daud.

2 ♂, 9 ♀, 4 hgr., and 2 juv. Aden and Haithalhim.

These specimens belong to the coarse type of lepidosis, as is proved by the number of scales around the middle of the body

<sup>1</sup> Monatsb. Berl. Ac. 1874, p. 369, pl. vii. fig. 2.



excluding the ventrals. The average number is 38, whereas in the variety with fine lepidosis the number of scales generally rises above 50.

Sex.	Snout to vent.	Tail.	Scales round body.	Ventrals.	Scales between thighs.	Length of 3rd toe, inner margin.	Pores.	
							R.	L.
♀...	71	118	36	10	17	13·8	18	17
♂...	70	160	38	10	18	11·8	20	19
♀...	70	—	38	10	17	11·3	17	17
♂...	63	138	38	10	17	11·0	24	22

“In holes in the sand among sparse vegetation.”

10. *ACANTHODACTYLUS CANTORI*, Günther.

*Acanthodactylus cantoris*, Günther, Rept. Brit. Ind. 1863, p. 73.

1 ♂, 2 ♀, 2 hgr., and 6 juv. Aden.

The four rows of scales encircling the fingers, the acutely pointed snout, and the greater number of ventral shields are characters by which this species can be at once distinguished from the obtusely-snouted *A. boskianus*. In its lepidosis it is intermediate between the extremes that occur in *A. boskianus*, the scales round the body seldom falling below 45 or rising above 48. In its coloration it resembles that species.

Col. Yerbury's specimens are the first record of its occurrence at Aden.

“Among holes in the sand among sparse vegetation.”

11. *EREMIAS GUTTULATA*, Licht.

1 ♀. Isthmus of Aden and Shaikh Othman.

“Occurs on the same kind of ground as the two species of *Acanthodactylus*, and is not unfrequently met with in dried-up jowari fields.”

12. *MABUIA BREVICOLLIS*, Wieg.

*Euprepes pyrrocephalus*, Wieg. Arch. f. Nat. 1837, p. 133.

*Euprepes brevicollis*, Wieg. l. c. p. 133.

*Euprepes perrotetii* (non D. & B.), Blanford, Zool. Abyss. 1870, p. 456.

*Mabuia brevicollis*, Boulenger, Cat. Liz. B. M. 2nd ed. iii. 1887, p. 169.

*Mabuia pulchra*, Matschie, SB. Ges. naturf. Fr. Berl. 1893, p. 29.

3 ♂ & 2 ♀. Shaikh Othman.

1 juv. ♂. Haithalhim.

2 ♂. Lahej.

5 juv. removed from ♀ from Shaikh Othman.

In the British Museum there is a large Skink obtained by Mr.

Jesse in Abyssinia, referred by Mr. Blanford<sup>1</sup> many years ago, and again more recently<sup>2</sup>, to *Euprepes perrotetii*, and which he suspected was the *Tiliqua burtoni*, Blyth<sup>3</sup>, from Somali-land.

Blyth's description of *Tiliqua burtoni* is very short. He compares it to "*Tiliqua rufescens* of India," but says that it differed in having a series of large scales along the upper surface of the tail. Now the Somali-land lizard that best agrees with Blyth's species, in this respect, is *M. hildebrandti*, and not the Abyssinian and Arabian *Mabuia brevicollis*, Wiegmann. Mr. Boulenger<sup>4</sup> has identified Mr. Blanford's lizard as *Euprepes brevicollis*, Wiegmann<sup>5</sup>, after having studied the type in the Berlin Museum, and also that of *E. pyrrocephalus*, Wiegmann, preserved in the same Institution, and which he considered to be identical with the former. Wiegmann states regarding *E. brevicollis*, which was from Abyssinia, "*capitis totiusque corporis pholidosis eadem quæ in pyrrocephala*"—a statement which is of importance as he mentions that the latter had two loreals, whereas in the specimen in the British Museum there is only one loreal—a condition, however, which is in all probability due to fusion of the shields. Apart from this abnormal feature, there can be no doubt that the Abyssinian lizard is the *E. brevicollis*, Wiegmann, of which a much more detailed description exists under *E. pyrrocephalus*. The latter was obtained by Hemprich and Ehrenberg on the island of Aschik in the Red Sea, and the former, as already mentioned, was from Abyssinia. The fact that the specimen in the British Museum was from Abyssinia and that it agreed on the whole, with the exception of having a single loreal, with the structural features and more especially the coloration of *E. brevicollis*, probably led Mr. Boulenger to select the term *brevicollis* as the specific name in preference to *E. pyrrocephalus*. The specimen that Mr. Boulenger dealt with was a female, and all the individuals from Aden of the same sex agree with Wiegmann's description of *E. brevicollis*, whereas all the males from Aden correspond to *E. pyrrocephalus*. From a consideration of these facts, it becomes evident that Wiegmann's description of *E. pyrrocephalus* was founded on the male and that of *E. brevicollis* on the female of the same species. The adult of *E. pyrrocephalus* measured about 137 millim. from the snout to the vent, which is only about 8 millim. shorter than the largest male collected by Colonel Yerbury.

Herr Matschie<sup>6</sup> has recently redescribed this species under the name of *M. pulchra*, his two specimens having been obtained also at Lahej, or close to it. The smallest of Colonel Yerbury's specimens is practically of the same size as Herr Matschie's largest example of his *M. pulchra*, as it is 64 millim. from snout to vent, while the latter is 61 millim. It agrees exactly with his description.

<sup>1</sup> Geol. & Zool. of Abyssinia, 1870, p. 456.

<sup>2</sup> Proc. Zool. Soc. Lond. 1881, p. 469.

<sup>3</sup> Journ. As. Soc. Beng. xxiv. pt. 2, 1856, p. 306.

<sup>4</sup> Cat. Liz. B. M. iii. 1887, p. 169.

<sup>5</sup> Arch. f. Natur. Berl. 1837, p. 133.

<sup>6</sup> SB. Ges. Berl. 1893, pp. 29-30.

*Mabuia brevicollis*, Wiegmann.

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb.	Length of hind limb.	Scales round body.	Ear-lobules.	Relation of anterior lorent to labials.	Position of post-nasal to labials.	Position of nostril to labials.	Axilla to groin.	Shoulder to anterior canthus of eye.	Locality.
♂ ...	145	180	30	25	43·7	57	32	2-2	over 2 & 3	over 1 & 2	over 1	71	40	Shaikh Othman. Lahcj.
♂ ...	142	160	28	20	42·5	54	32	2-3	over 2 & 3	over 1 & 2	over 1	73	40	
♀ ...	133	153	31	22	40	48	30	2-2	.....	over 1 & 2	over 1	63	40	Abyssinia.
♀ ...	130	133?	25	18	35	46	32	2-2	over 1 & 2	over 1	over 1	71	37	Shaikh Othman. Lahcj.
♂ ...	125	170?	24·5	19·2	39·6	50	32	R. 2 L. 3	over 2 & 3	over 1 & 2	over 1	66	36	
♂ ...	120	135	27	21	38	48	31	R. 3 L. 2	over 2 & 3	over 1 & 2	over 1	59	35	Shaikh Othman.
♂ ...	117	131?	24·7	17	39	51	32	3-3	over 2 & 3	over 1 & 2	over 1	58	34	" "
♀ ...	97	159	20·7	13	31·8	41	32	R. 3 L. 2	over 2 & 3	over 1 & 2	over 1	47	28	" "
♂ ...	64	110	15	10	21	29	32	R. 3 L. 2	over 2 & 3	over 1 & 2	over 1	32	18·5	Haithalhin.
Juv....	44	64	13	8·3	16	20	32	.....	.....	.....	.....	...	.....	Fetuses from large female from Shaikh Othman.
Juv....	44	61	13	8·6	16	21	32	.....	.....	.....	.....	...	.....	
Juv....	42	60	13	7	16	21	32	.....	.....	.....	.....	...	.....	

1 Gravid with five fetuses.

The accompanying table (p. 648) gives the relations of some of the more important head-shields and other details connected with the external features of the species. The number of scales round the body varies from 30 to 34. The smallest number is in the Abyssinian specimen in the British Museum, but whether it is distinctive of the Abyssinian individuals generally is not known, as Wiegmann did not record the number of scales round the body. Mr. Matschie's highest number is 34, but Colonel Yerbury's only reach 32.

The females are olive-brown or olive-grey, with a varying number (generally 6, occasionally 5) of dark brown longitudinal lines marked at regular intervals with enlarged dark brown spots, each generally having a white spot associated with it. Some of these lines are prolonged on to the tail. The intervals between two lines generally contain two scales, rarely three. The shields of the head are margined with dark brown, and there are some obscure dusky lines on the throat. The underparts are white. The males are generally brown above, with obscure indications of darker brown bands, sometimes entirely absent, and each scale is margined with brown. The back is frequently white-spotted and also the sides of the head and neck, but these spots are variable, and in some they are all but absent. There is generally a dark black band behind the eye passing over the ear and becoming dusky along the sides. In some the top of the head is reddish brown, the sides of the head from behind the ear forwards to the snout, and invading the lower labial margin, bright brick-red spotted with white. In others these parts are all inky black, including the chin and throat, but white-spotted. In some black and white prevail on the sides of the head.

This lizard is viviparous. The female from Shaikh Othman was gravid with five fœtuses, the measurements of three of which are given in the table.

“The greater number of these lizards were caught in the traps set for rats and other small mammals in fields, gardens, and elsewhere, but a few were dug out of the ground. They seem to be vegetable feeders, the great attraction as a bait being an onion.”

With reference to the food of this species, I have opened the stomachs of a number of them and have found the contents to be chiefly the remains of insects. The little vegetable matter that occurred in their stomachs was in all likelihood swallowed by the lizard in seizing its insect prey, just as *Chalcides sepioides* swallows quantities of sand.

### 13. *MABUIA TESSELLATA*, n. sp. (Plate XXXVI. fig. 2.)

1 adult ♀.

Head moderately long, snout obtusely rounded. Nostril behind the suture of the rostral and first labial, pierced in the hinder part of a small nasal; a small postnasal resting wholly on the first labial. Supranasals linear, in contact behind the rostral. Frontonasal considerably broader than long. Præfrontals form a narrow suture

before the frontal. The frontal as long as the frontoparietals and interparietals, in contact externally with the first to the third supraoculars. Four supraoculars and five supraciliaries. Frontoparietals small, forming a broadish suture before the interparietal. Interparietal narrowly separating the parietals. A pair of nuchal plates. Two loreals, the anterior resting on the second labial, and the second on the third labial and very partially on the second. A small shield, behind the second loreal, resting on the 3rd and 4th labials, and another on the 4th and 5th labials. Fifth labial below the eye, not contracted below, entering widely into the labial margin. A large transparent ocular disk, larger than the ear-opening. The ear round, with two or three small lobules at the anterior border. Thirty-four rows of scales round the middle of the body, nearly smooth, but showing faint indications of a feeble tricarination (fig. 2a). Limbs well developed; the fore limb when laid forwards reaches to the anterior angle of the eye, and hind limb when stretched forwards reaches along two-thirds of the distance between the axilla and groin. The lamellæ of the digits are provided with prominent brown eminences, one to the centre of each lamella close to its distal margin, and resembling a short obtuse keel. The palmar and plantar surfaces with prominent tubercles more or less brown at the apices. Tail considerably longer than the head and body.

Head brownish above, the shields margined with dark brown; body olive, with a bluish tint on the sides, each scale margined with dark brown and producing a tessellated appearance. A few dark spots on the labials. Under surface white with a faint bluish tinge.

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Fore limb.	Hind limb.	Scales round body.
♀ . . . .	60	80	13	8	1.9	22.5	34

This is a species allied to *M. brevicollis*, but does not reach to half its dimensions, as the type is a gravid female. It differs from it, moreover, in the arrangement of its upper labials, in the greater size of the palpebral disk, in the structure of its toes, in the number of scales round the body, and in its markedly different coloration.

#### 14. SCINCUS HEMPRICHI, Wieg.

*Scincus hemprichii*, Wieg. Arch. f. Naturg. 1837, p. 128.

1 ♂, 1 ♀, and 1 juv. Shaikh Othman.  
2 ♀. Lahej?

These specimens differ from the type in the Berlin Museum, which I have examined, in having 24, instead of 22 rows of scales round the middle of the body. In one also there are only five supraorbitals on one side of the head, whilst in the largest specimen the frontoparietals have completely united with the frontals. In other respects they perfectly agree with the type. The number

of scales varies at Aden, as Professor Boettger<sup>1</sup>, who was the first to record it from there, mentions that his specimen or specimens had only 22 rows of scales round the body.

The type of the species was obtained in Abyssinia by Hemprich and Ehrenberg.

Sex.	Snout to vent.	Tail.	Length of head.	Width of head.	Length of fore limb.	Length of hind limb.	Scales round body.	
♀...	134	72	34	26	40	41	24	Lahej, Aden.
♀...	96	52	24	15.5	31	33	24	Haithalhim.
♀...	68	37	16.5	10.7	21.4	23.5	24	Shaikh Othman.
♂...	53.5	26	15	9	17.5	18.6	24	" "
Juv.	45	32	13.4	8.2	15	16	24	" "

“Almost all the specimens obtained were dug out of the sand.”

#### 15. CHALCIDES (GONGYLUS) OCELLATUS, Forskål.

2 adults and 2 juv. Aden.

1 adult. Shaikh Othman.

1 adult. Lahej.

This species attains to a considerable size at Aden and its neighbourhood, but adheres to the typical form first described from Egypt by Forskål, and the number of scales round the body varies from 28 to 30. Some Aden specimens differ somewhat in coloration from Egyptian individuals, as the black and white spots are more strongly developed, the white more so than the black, and the arrangement in transverse lines is less apparent. In the intensity of the markings these Aden lizards distinctly recall those on the Berbera side of the Gulf of Aden.

Mr. Shopland, of Aden, presented a specimen of this Lizard to the British Museum some years ago.

“Very common in Aden, Shaikh Othman, and Lahej. I was at first inclined to think that a Skink seen in the stony water-courses, high up on the Shum-Shum range, was of a different species, but, although I did not get a specimen, I finally came to the conclusion that it was the same.”

#### 16. CHAMÆLEON CALCARIFER, Peters.

*Chamæleo calyptratus*, Peters (non A. Duméril), Monat. Berl. Ac. 1854, p. 615.

*Chamæleon calyptratus*, A. Dum. partim, Mocquard, C. R. Philom. 1893, no. 19, p. 5.

*Chamæleon calcaratus*, Peters (non Merrem), Monat. Berl. Ac. 1869, p. 445.

<sup>1</sup> Bericht Offenb. Ver. 1892, p. 62.

*Chamæleon calcarifer*, Peters, Monat. Berl. Ac. 1870, p. 110 (foot-note); Reise n. Mossamb. iii. (1882) p. 22, pl. iv a.; Sclater, *vide* Boulenger, Proc. Zool. Soc. Lond. 1885, p. 717 et p. 833; Boulenger, Cat. Lizards B. M. iii. 1887, p. 444; Mocquard, C. R. Soc. Philom. 1895.

3 ♂ and 1 ♀. Shaikh Othman.

1 ♂. Haithalhim.

Ten years ago Colonel Yerbury presented a large chameleon to the British Museum. He captured it on a bush, on the east bank of the Toban river, beyond Isfian near Aden. Mr. Boulenger identified it as the *Chamæleon calcarifer*, Peters, founded on a chameleon which Peters had received, in November 1843, from Lieut. Barnard of H.M.S. 'Cleopatra' while the vessel was lying in the Bay of Bembatooka on the west coast of Madagascar. Peters in his description of the species gives Madagascar as its habitat. More than half a century has elapsed since Peters obtained the lizard, but although the island has been largely explored by various naturalists, and many new species of chameleons have been discovered, not a trace of this large and fine species has been forthcoming, whereas, on the other hand, chameleons presenting all the features of *C. calcarifer*, and agreeing well with Peters's figure, have been recorded from Aden. Mr. Boulenger has examined the type of *C. calcarifer* and, as has been just stated, has identified them with it. On the other hand Mr. Matschie, who has also received this large chameleon from Aden and who has free access to the type of *C. calcarifer* preserved in the Berlin Museum, regards it as a species distinct from *C. calcarifer* and has named it *C. arabicum*. But in arriving at this conclusion he seems to have been somewhat influenced by Peters's statement that its native country was Madagascar.

In order if possible to throw some light on the origin of Peters's chameleon, I applied to the Lords of the Admiralty for permission to examine the log of H.M.S. 'Cleopatra,' preserved in the Record Office. This was granted to me. This ship, under the command of Captain C. Wyvill, sailed from England on the 15th July, 1842, and Lieut. F. L. Barnard, Professor Peters's friend, is mentioned in the log as accompanying the ship. The 'Cleopatra' went to the Cape and was engaged in cruising along the coast of Africa from Natal to Zanzibar, the latter port being the furthest northern point the vessel reached. The ship was frequently at Quillimane and at Mozambique, and appears to have been engaged, among other duties, in suppressing the Slave trade. On the 24th Sept., 1843, it was off Zanzibar, and left it on the 10th October of the same year, returning by Mohilla, Johanna, to Fort St. Sebastian, Mozambique, where the vessel arrived on the 26th October. On the following day it again sailed, and in the log the entry is "running for Bembatooka Bay." It anchored off Majunga on the 30th Oct., and on the 1st November the boats were sent ashore for bullocks and vegetables. The day following, its course was directed to Nossi Bé, at the north-western end of Madagascar.

As this chameleon belongs to a section of the genus not known to occur in Madagascar, it is possible that Lieut. Barnard may have obtained it either at Mozambique or more probably at Zanzibar. To the latter port it might have been carried in a native dhow, either from Aden, or from Makulla, in the Hadramut, in which latter Sultanate the species is quite as common as at Aden, judging from the number of fine specimens brought back by my collector.

It does not seem, in view of Peters's description and figure of *C. calcarifer*, that Herr Matschie has satisfactorily established the specific distinctness of the Aden chameleon, and, until more convincing evidence is adduced, I adhere to the view first expressed by Mr. Boulenger.

In Colonel Yerbury's specimens there is great variation in the form of the casque, as it is anteriorly convex in some, while the mesial ridge in others is perfectly flat and directed backwards. There are various modifications of these two extremes: The scales of the body are all more or less conical as described by Mr. Matschie, but the degree to which this exists depends a good deal on the strength of the spirit in which the specimens have been placed and the time they have been in spirit, at least such is the case with the Aden specimens I have examined; for the recent specimens have more definitely conical scales than those that have been long in alcohol. In the former the tubercles are crowded together hiding the fine granules, while in the latter the tubercles are apart, more or less flattened and exposing the granules. In well-preserved specimens the scales above the shoulder and for a depth of five rows below the dorsal ridge are larger than the body-scales generally, and perfectly flat.

The occipital lobes, as in *C. vulgaris*, are the subject of considerable variation in the form of their outline, being much more roundly convex in some than in others. Their free margin is covered with conical tubercles, but they vary considerably in size and in their degree of convexity.

Sex.	Snout to end of casque.	Angle of mouth to summit of casque.	Snout to vent.	Vent to tip of tail.	
♂ ...	75	53	215	215	Huswah, near Aden.
♂ ...	62	50	200	224	Aden.
♀ ...	72	51	198	193	Aden.
♂ ...	65	47	196	200	Toban River, Isfian, near Aden.
♂ ...	62	46	174	190	Haithalhim.

"This chameleon is plentiful inland and may be found on any fairly large bush. In 1884, I found at Huswah, in a small bush of



*Dipterygium glaucum*, a small purple chameleon about four inches long. Although I kept a sharp look out for a specimen during my recent visit to Aden, I failed to obtain one, but I saw one in the possession of two Frenchmen who visited Lahej when I was there. It may be the young of *C. calcarifer* or possibly another species, but I am disposed to think that it is the former."

## OPHIDIA.

17. ZAMENIS RHODORHACHIS, Jan<sup>1</sup>.

*Zamenis rhodorhachis*, Jan, Boulenger, Cat. Snakes B. M. i. 1894. p. 398.

1 ♀ and 3 juv. Aden.

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.
♀ ...	786	.....	221	1/1	.....	19	9+9	5 & 6
Juv.	385	155	226	1/1	133	19	9+9	5 & 6
Juv.	310	120	222	1/1	128	19	9+9	5 & 6

Sex.	Sub-oculars.	Præ-oculars.	Relation of præoculars and frontal.	Post-oculars.	Temporals.	Nasals.	Loreals.
♀ ...	1	1	B. C. <sup>2</sup>	2	2+3	2	1
Juv.	1	1	B. C.	2	2+3	2	1
Juv.	1	1	B. C.	2	R. 2+2 L. 2+3	2	1

The variation in the number of the ventrals of this species is very great, ranging from 213 to 262. The highest number occurs in Egypt and in Midian, and in the former country no specimen has yet been found with a lower number of ventrals than 248. In Eastern and South-eastern Arabia, Muscat to Aden, the ventrals range from 220 to 239, while, on the other hand, from Bushire to Baluchistan (Kalagan) these numbers fall very low, the range being from 214 to 218. In the Būgti hills, on the right bank of the Indus, to the north of Jacobabad, and in North-western India,

<sup>1</sup> I am indebted to the Trustees of the Indian Museum for the opportunity of re-examining the types of *Z. ladacensis*. They are unquestionably identical with Jan's *Z. rhodorhachis*. At the time I described the species, Jan's work was not in the Library of the Indian Museum, Calcutta.

<sup>2</sup> B. C. signifies "broadly in contact"; C. "contact"; and N. C. "not in contact."

Gilgit, and Ladak the numbers vary from 225 to 246, and in Transcaspia the variation is about the same. These facts would seem to indicate that certain geographical areas are characterized by variation more or less restricted within numerical limits distinctive of each area.

“This I believe to be the commonest snake found in Aden. I had several specimens given me from various sources.”

18. *PSAMMOPHIS LACRYMANS*, Reuss.

? *Coluber schokari*, Forskål, Descr. An. &c. 1775, p. viii et p. 14.

*Coluber lacrymans*, Reuss, Mus. Senck. ii. 1834, p. 139.

*Psammodphis punctatus*, D. & B. Erpét. Gén. vii. 1854, p. 896, Atlas, pl. 77. fig. 2, skull.

*Psammodphis sibilans*, var. *hierosolimitana*, Jan, Icon. Gén. livr. 34, Mars 1870, pl. iii. fig. 2.

*Psammodphis sibilans*, var. *quadrilineata*, Jan, *op. cit.* livr. 34, fig. 1.

1 ♂. Haithalhim.

1 ♀. Shaikh Othman.

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.
♂ ...	813	255	178	1/1	.....	17	9	5 & 6
♀ ...	707	437	168	1/1	149	17	9	5 & 6

Sex.	Sub-oculars.	Præ-oculars.	Relation of præoculars and frontal.	Post-oculars.	Temporals.	Nasals.	Loreals.
♂ ...	0	1	C.	2	2+3	2	1
♀ ...	0	1	B. C.	2	2+3	2	1

The tail of the male is imperfect, but the injured extremity has become covered by a remarkably unguulate-like scale, forming a sheath to the tip, and keeled on its upper surface.

On the right side of the male the first nasal is nearly wholly confluent with the rostral, an abnormality I have never before observed in any serpent, and Mr. Boulenger, in his wide experience, has never met with it. This specimen belongs to the variety which is uniformly coloured brownish olive, with generally a dark spot on each scale, the under surface being finely punctulated with blackish and reddish, most pronounced along the mesial area of the ventrals, with a black spot generally on the angle of each.

The second specimen belongs to the lineated variety.

This is the first record of the occurrence of this species in the Aden district.

“Appears to be fairly common inland.”

19. *CÆLOPELTIS MOILENSIS*, Reuss.

*Coluber moilensis*, Reuss, Mus. Senck. i. 1834, p. 142, pl. vii. fig. 1 a & b.

*Cælopeltis producta*, Gervais, Ac. Sc. et Lettres de Montpellier, iii. 1857, p. 512, pl. v. fig. 3.

*Rhagerhis producta*, Peters, Monat. Berl. Ac. 1862, p. 275.

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.
♀ ..	610	139	176	1/1	53	17	8	4 & 5
Sex.	Sub-oculars.	Præ-oculars	Relation of præocular and frontal.		Post-oculars.	Temporals.	Nasal.	Loreal.
♀ ..	0	1	B. Ex. <sup>1</sup>		3+3	2+3	1	1

Recorded for the first time. The coloration is of the usual type met with on the African coast.

“This specimen was given me by Captain Nurse, 13th Bombay Native Infantry. It was killed by one of the sepoy of the regiment when returning from field-firing.”

20. *TARBOPHIS GUENTHERI*, n. sp. (Plate XXXVI. fig. 3.)

*Dipsas obtusa*, Boulenger, Ann. & Mag. N. H. (5 ser.) xx. 1887, p. 407.

1 ♂, 1 ♀. Lahej.

Snout not so broad or rounded at the point as in *Tarbophis obtusus*, and less broad than in *T. rhinopoma*<sup>2</sup>, but truncated as in the latter species. The rostral is much broader than in *T. obtusus*, and more rounded in its upper outline, and in this latter respect it more resembles *T. rhinopoma* than *T. obtusus*. The nostril is a single plate, with a cleft below it, as in the latter species; whereas in the former the nostril is perforated in a single nasal and has no cleft. The length of the frontal equals the distance between its anterior border and the tip of the snout, while in *T. obtusus* the length of the frontal considerably exceeds that interval, whereas in *T. rhinopoma* it falls short of it. In the former the lateral margins of the frontal are slightly concave, and in the latter convex; whereas in this form this shield has very slightly concave lateral borders, and is altogether broader than in *T. obtusus*. The greatest breadth, anteriorly, of the frontal equals the length of its supraorbital suture, while in *T. obtusus* it considerably exceeds the length of that suture, whereas in *T. rhinopoma* it equals the length of both supraorbital and parietal sutures. The parietals in their proportions exceed those of *T. obtusus* and of *T. rhinopoma*, as their extreme length nearly equals that of the frontal and parietals combined, whereas, in these two species, the parietals equal

<sup>1</sup> Broadly excluded.

<sup>2</sup> Conf. Boettger, Radde's Faun. Flor. Casp.-Geb. 1886, p. 72; Boulenger, Ann. Mus. Civ. Genoa, (2 ser.) vol. xv. (xxxv.) 30 Marzo, 1893, p. 7, et Journ. Bombay Nat. Hist. Soc., May 1895, p. 325.

the length of the frontal and one half of the præfrontal. In *T. obtusus* and *T. rhinopoma* the supraocular is excluded from contact with the præfrontal by the præocular, while in *T. guentheri* it touches the præfrontal and excludes the præocular from contact with the frontal. There are nine upper labials, but exceptionally, asymmetrically, ten; but in the other two species the number is unusually ten, and exceptionally eight, nine, or eleven. The third, fourth, and fifth, or exceptionally the fourth and fifth labials enter the orbit, whereas the fourth, fifth, and sixth in *T. obtusus*, and the third, fourth, and fifth, fourth and fifth, or the fourth, fifth, and sixth in *T. rhinopoma* enter the eye. The chin-shields are narrower and more elongated than in these two species. There are 21 scales round the body, but 23 in *T. obtusus* and *T. rhinopoma*. The anal, in this species and in *T. rhinopoma*, is invariably single, but it is always divided in *T. obtusus*. Ventrals 235-274; in *T. rhinopoma* 268-280; and in *T. obtusus* 257-272. The caudals in *T. guentheri* are 66-72; in *T. rhinopoma* 76-82; and in *T. obtusus* 66-81.

The general colour is exactly as in *T. obtusus* in the majority of the specimens, but in one specimen from Muscat the body-colour is greyish with numerous narrow black markings, interrupted bands, becoming indistinct posteriorly, and separated from each other by narrow whitish interspaces or lines. The upper labials are slightly orange-yellow with blackish margins; ventrals pure white.

This species was obtained some years ago at Muscat by Dr. Jayakar, and my collector who accompanied Mr. Bent on his expedition to the Hadramaut brought back two specimens.

The invariable presence of an undivided anal and of 21 rows of scales round the body of these Eastern Arabian snakes seem to entitle them to specific rank. At the same time, if a single specimen had shown any tendency to division in the anal, or had there been any variation in the number of the body-scales, I should have hesitated to follow the course I now adopt and would have regarded them as varieties of *T. obtusus*.

To bring out the differences that exist between the three species, I append the following tables (pp. 658, 659).

I have much pleasure in connecting Dr. Günther's name with the species.

"These two specimens were obtained in a sun-dried brick wall at Lahej. They were found within a few inches of each other, and each of them had breakfasted on a sparrow. In one the bird was quite fresh, and had evidently been recently caught, while in the other it was partially digested."

#### 21. *ECHIS CARINATA*, Schneider.

1 ♀. Lahej.

Snout to vent 436; tail 50. V. 159; A. 1; C. 30. Scales 28; upper labials 10. Scales round eye 17 and 18. Nasals 2.

"This, I believe, to be the only venomous snake found at Aden, where, and also inland, it is not uncommon."

*Tarbophis obtusus*, Reuss.

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Præ-oculars.	Relation of præoculars and frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.	
♀ .....	840	130	263	1/1	75	23	R. 10 L. 11	R. 4, 5, 6. L. 5, 6, 7.	1	B. C.	2	2+4	2	1	Belim.
♀ .....	840	125	260	1/1	70	23	10	4, 5, 6.	1	B. C.	2	2+3	2	1	Mehalla el Kobra.
Hgr.	505	80	262	1/1	77	23	10	4, 5, 6.	1	0	2	2+3	2	1	Gizeli.
Juv.	396	55	266	1/1	67	23	10	4, 5, 6.	1	C.	2	2+3	2	1	"
"	335	46	258	1/1	69	23	10	4, 5, 6.	1	R. C., L. 0	2	2+3	2	1	"
"	305	49	25	1/1	79	23	10	4, 5, 6.	1	0	2	2+3	2	1	"
♀ .....	1103	161	272	1/1	72	23	10	4, 5, 6.	1	C.	2	R. 3+4 L. 3+3	2	1	Tel el Amarna.
Juv.	343	51	264	1/1	66	23	10	4, 5, 6.	1	B. C.	2	3+3	2	1	"
"	390	56	258	1/1	70	23	10	4, 5, 6.	1	B. C.	2	R. 2+4 L. 2+3	2	1	"
"	435	69	263	1/1	81	23	10	4, 5, 6.	1	C.	2	2+3	2	1	Assouan.
♂ .....	1105	170	271	1/1	75	23	10	4, 5, 6.	1	B. C.	2	2+3	2	1	Egypt.
♀ .....	963	140	246	1/1	72	23	10	4, 5, 6.	1	?	2	R. 2+4 L. 2+3	2	1	?

*Turbophis guentheri.*

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Pre-oculars.	Relation of preoculars and frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.
♂ .....	987	160	235	1	66	21	9	3, 4, 5.	1	B. Ex.	2	2+3	2	1
♀ .....	851	155	240	1	71	21	R. 10 L. 9	R. 4, 5, 6, L. 3, 4, 5.	1	B. Ex.	2	2+3	2	1
♀ .....	850	127	274	1	67	21	9	3, 4, 5.	1	B. Ex.	2	2+2	2	1
♂ .....	695	110	264	1	69	21	9	R. 4, 5, L. 3, 4, 5.	1	B. Ex.	2	2+2	2	1
♀ .....	955	147	236	1	69	21	9	3, 4, 5.	1	B. Ex.	2	2+2	2	1
♀ .....	602	101	238	1	72	21	9	R. 4, 5, L. 3, 4, 5.	1	R. C. L. 0.	2	2+2	2	1

*Turbophis rhinopoma*, Blanford.

Sex.	Snout to vent.	Tail.	Ventrals.	Anal.	Caudals.	Scales.	Upper labials.	Labials entering orbit.	Pre-oculars.	Relation of preoculars and frontal.	Post-oculars.	Temporals.	Nasals.	Loreal.
♂ .....	1018	160	268	1	77	23	10	4, 5, 6.	1	B. C.	2	R. 2+3 L. 2+5	1	1 E. 0
Juv.	421	75	280	1	82	23	9	4, 5, 6.	1	B. C.	2	R. 3+4 L. 2+5	1	1 E. 0

## BATRACHIA.

1. *RANA CYANOPHLYCTIS*, Schneider. (Plate XXXVII. fig. 2.)

1 ♂, 11 ♀, and 1 tadpole. Haithalhim.

Eleven years ago Mr. Boulenger<sup>1</sup> pointed out the identity of *Rana ehrenbergi*, Peters<sup>2</sup>, with the common Indian species, *Rana cyanophlyctis*. I have compared Colonel Yerbury's specimens with some excellently preserved examples of *Rana cyanophlyctis* collected quite recently by Lieut. Stanley Flower at Benares, and presented by him to the British Museum, and I am fully convinced of the correctness of Mr. Boulenger's identification.

The Aden specimens are slightly larger than any examples of the species preserved in the British Museum, but Colonel Yerbury informs me that his largest specimens were specially selected on account of their size.

As the tadpole of this species has never been described, I take this opportunity to do so, as I am fortunately in the possession of a number of well-preserved specimens obtained by my collector at Hadramaut. I have followed the method of description adopted by Mr. Boulenger in his paper<sup>3</sup> on the tadpoles of European frogs and toads.

The length of the body is about three fifths the length of the tail, and its breadth three fifths of its length. The distance between the nostrils is about one half their distance from the extremity of the snout, and they are placed nearer to the eyes than to the snout, their distance from the eye about equalling the interorbital breadth. The eyes are on the upper surface of the head, and their anterior border is distant from the snout the length of the interval between their lower border and the spiraculum. The distance between them is slightly less than that between the nostrils and the snout and is about twice as broad as the mouth. The anterior border of the spiraculum is about equally distant from the snout and from the insertion of the limbs, and the opening is directed backwards and upwards, and is more visible from below than from above. The anus is directed to the right. The tail is about three times as long as it is deep and ends in an obtusely pointed tip. The upper caudal crest is very deep and convex, and twice as deep as the lower crest. It is prolonged on to the back to the vertical of the spiraculum, and at its anterior extremity a fold passes to each eye. The body portion of the crest generally lies recumbent in the dorsal furrow. The depth of the muscular portion of the base of the tail is about one half the greatest length of the organ.

The beak is entirely black and is strongly hooked, the upper portion broadly overlapping the much hooked lower segment. A single marginal upper line of teeth, and two lower lines of teeth, the most internal of the latter being slightly larger than the

<sup>1</sup> Cat. Batr. Grad. 1884, p. 110.

<sup>2</sup> Monat. Berl. Ac. 1863, p. 79; Matschie, SB. Ges. naturf. Fr. 1893, p. 31.

<sup>3</sup> Proc. Zool. Soc. Lond. 1891.

external. On the mucous membrane inside the internal row of lower teeth there is a horny black area parallel to it, but interrupted in the mesial line. A more or less double papillary fold begins immediately above the angle of the mouth and curves downwards and forwards to near the mesial line of the lower lip, where it becomes interrupted, the folds of the two sides being separated from one another by a non-papillary interspace. The papillæ are arranged on the margins of the fold, and those near the mesial line of the mouth are generally the longest.

The muciferous crypts cannot be traced, but the lachrymal gland is well developed.

The upper surface of the body is pale yellowish olive and somewhat leaden coloured on the sides and is finely spotted with black. The sides of the tail are pale greyish yellow, covered with large black spots, sparse proximally, but numerous distally and invading the crests. The upper surface of the limbs is yellowish olive spotted with black. The under surface yellowish white, with obscure small black spots on the sides of the belly and of the throat.

Measurements of largest tadpole:—Total length 107; length of body 40; width of body 27?; length of tail 67; depth of tail 24.

Length of largest mature female:—Snout to vent 97.

These specimens agree exactly with tadpoles of *R. cyanophlyctis* from Ceylon. In the latter the horny-like line within the mouth is not so markedly developed as in the Aden larvæ.

In the European species of the genus *Rana* the upper teeth are never less than in two lines and the lower teeth in three series, so that this Asiatic form differs very materially in possessing only one row above and two below. In the tadpoles of European frogs of the genus *Rana* the buccal papillary fold is always continuous round the lower lip, whereas, as has been shown, it is interrupted in *Rana cyanophlyctis*.

The beak also is larger, stronger, and more hooked than in the European species. The extent to which the dorsal caudal crest is prolonged on to the body in the Asiatic frog more recalls the tadpole of a *Hyla* than that of a *Rana*.

Many years ago Dr. Günther<sup>1</sup> stated that *Rana tigrina* "when frightened jumps over the surface of the water, much the same way as it does on land," and Mr. Boulenger<sup>2</sup> also mentions that "it is said" to have this habit. Mr. Blanford,<sup>3</sup> however, has pointed out "that the species so well known by this habit in India had never been satisfactorily determined, but thought that it was *Rana cyanophlyctis*, and that probably *Rana hexadactyla* had a similar habit." I am indebted to Sir William Flower for permission to quote the following passage from a letter from his son which seems fully to establish that Mr. Blanford was right in his supposition,

<sup>1</sup> Rept. of Brit. India, 1864, p. 407.

<sup>2</sup> Fauna of Brit. India, Rept. & Batr. 1890, p. 450.

<sup>3</sup> Fauna Brit. Ind., Rept. & Batr. 1890, p. 450 footnote.



and that it is *Rana cyanophlyctis*, and not *R. tigrina* that has this habit. Lient. Flower says:—"With regard to the frog *Rana cyanophlyctis* which jumps over the surface of the water . . . I never saw *Rana tigrina* do so. When disturbed on the bank, it always takes a plunge into the water head foremost, and goes straight to the bottom, but *R. cyanophlyctis* jumps, alighting on the surface on all fours, and then goes on again, sometimes making a dozen leaps before it finally goes under the surface. Also it will jump out of the water in the middle of a pond, and leap along the surface in a wonderful manner, finally jumping out on the land."

Colonel Yerbury also observed the same habit in the Aden frogs, but he seems to think that it is confined to the younger individuals, as will be seen from the following note extracted from his field-book:—"These frogs were in great abundance in the bed of the stream at Haithalhim. The small ones were everywhere and were frequently seen leaping along the surface of the water in the manner so often seen in India and Ceylon. The big ones were seen hiding in the deep pools or else lying with their noses out of water among the giant reeds in six or eight inches of water. In either case they required searching for, and, when found, catching—a by no means easy matter. I never recollect seeing a big fellow bound along the surface of the water, and can quite understand how such a method of progression is unsuited to their size."

## 2. BUFO PENTONI, Andr.

3 ♂. Lahej.

5 ♂. Haithalhim.

These specimens agree in every respect with those from Suakin on which I founded the species, except that the horny induration on the swelling of the snout is absent, and in some specimens recently collected by me at Suakin it is also wanting. It must, therefore, not be regarded as a persistent character, until more information is obtained as to its true nature.

Mr. Matschie has recorded the occurrence of *Bufo arabicus*, Rüpp., at Aden, but it is just possible that it may prove to be *B. pentoni*.

## 3. BUFO ANDERSONI, Boulenger. (Plate XXXVII. fig. 3.)

2 jr. and one tadpole. Lahej.

This is the first notice of the occurrence of this Toad at Aden, but Mr. Boulenger has recorded it from Muscat, and the *B. viridis*, var. *orientalis*, Werner<sup>1</sup>, from the latter locality may possibly prove to be the same species. The following is a description of the tadpole of this Toad:—

The length of the body is about four sixths the length of the tail, and its breadth almost three fifths of its own length. The depth of the tail is about one fourth of its length. The nostrils are situated about equally distant from the snout and the eyes; and the interval between them is about one half the distance between

<sup>1</sup> Verh. zool.-bot. Ges. Wien, xlv. 1893, p. 20,

the eye and the spiraculum, and one half the diameter of the eye more than the distance between the nostril and the eye. Eyes placed on the upper surface of the head rather widely apart, the interval between them equalling their distance from the snout and falling short of that between them and the spiraculum. The spiraculum is placed slightly anterior to the middle line of the body, and is directed straightly backwards, and is visible only from above. The anus is median in position. The tail is about four times as long as deep, and is pointed at its tip. The caudal crests are of nearly equal breadth and parallel to one another. The depth of the muscular part of the base of the tail is about one sixth the length of the organ.

Beak with a narrow black margin along the edge of each section, the lower section much smaller than the upper and almost wholly hidden by it. Two upper rows of teeth, the innermost widely interrupted in the middle, and the outer with a slight breach of continuity, possibly due to an injury. Three unbroken rows of lower teeth. A feeble ill-defined papillary fold at the side of the mouth. Muciferous crypts not visible.

Blackish above and partly so below. Sides of tail pale greyish yellow, finely marked with black pigment, darkest along the base of the dorsal crest. In another and younger specimen the body and tail are blackish brown, and the caudal crest is yellowish with fine black-pigment spots here and there.

Measurements of tadpole:—Total length 14; tail 19; breadth of body 19; depth of tail 4.5.

This tadpole is intermediate in character between the tadpoles of *B. viridis* and *B. vulgaris*, but it more resembles the latter than the former in the shape of its caudal crests, which are, however, less developed than in *B. vulgaris*. The tail in its more pointed character differs from both, but the specimen is not in a good state of preservation.

#### EXPLANATION OF THE PLATES.

##### PLATE XXXVI.

- Fig. 1. *Hemidactylus yerburii* (nat. size), p. 640.  
 1 a. Under surface of fingers, enlarged.  
 1 b. " " " toes "  
 1 c. Chin-shields.  
 1 d. View of upper surface of snout, enlarged.  
 1 e. Tubercles of back, enlarged.  
 Fig. 2. *Mabuia tessellata* (nat. size), p. 649.  
 2 a. Enlarged view of dorsal scales.  
 Fig. 3. *Tarbophis guentheri* (nat. size), upper view of head, p. 656.  
 3 a. Side view of head.

##### PLATE XXXVII.

- Fig. 1. *Latastia neumanni*, Matschie (nat. size), p. 643.  
 1 a. Scales of upper surface of body, enlarged view.  
 Fig. 2. *Rana cyanophlyctis*, Schneider; tadpole (nat. size), p. 660.  
 2 a. Mouth; enlarged.  
 Fig. 3. *Bufo andersoni*, Boulenger; tadpole, (nat. size), p. 662.  
 3 a. Mouth, enlarged,

7. On some Points in the Anatomy of *Nautilus pompilius*.  
By J. GRAHAM KERR, Christ's College, Cambridge.

[Received June 17, 1895.]

(Plates XXXVIII. & XXXIX.)

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| <p>I. Introduction, p. 664.<br/>         II. The Body-cavity of <i>Nautilus</i>,<br/>         p. 664.<br/>         III. The Male Genital Ducts and<br/>         Penis, p. 671.<br/>         IV. The Buccal Nervous System,<br/>         p. 673.<br/>         V. The Innervation of the "Inner<br/>         Inferior Lobe," p. 675.<br/>         VI. The Post-anal Papillæ and<br/>         Nerves, p. 676.</p> | <p>VII. The Spermatophore-receiving<br/>         Apparatus, p. 677.<br/>         VIII. The Morphology of the "Arms"<br/>         of Cephalopods, p. 678.<br/>         IX. The Phylogenetic Relationships<br/>         of the Cephalopoda, p. 683.<br/>         X. Summary of Conclusions,<br/>         p. 685.<br/>         Explanation of the Plates,<br/>         p. 689.</p> |
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I. *Introduction.*

During the year 1893 Mr. Adam Sedgwick very generously placed at my disposal a number of specimens of *Nautilus pompilius* with the suggestion that I should make an examination of their structure. The specimens were twenty-five in number, of which, however, the great majority were very young and immature. Owing to the method of preservation and to several months' sojourn in sawdust moistened with spirit, the condition of the specimens was usually such as to render them unfit for histological study. Fortunately one of them was sufficiently good to allow the use of the section-method to confirm the results of minute dissection. In the following somewhat fragmentary paper it is my purpose to touch upon what seem to me the more important points at which I have arrived, hoping at some future date, if able to obtain properly preserved specimens, to extend my investigations and to fill up the obvious lacunæ.

I can hardly adequately express the obligation under which I am to Mr. Sedgwick for the generous gift by which he has made these investigations possible and opened the way to what, however poor its results are so far, has proved a study of absorbing interest, and also for much kind advice and encouragement. To Mr. Wilson also a word of thanks is due for the care with which he has attended to the illustrations.

II. *The Body-cavity of Nautilus.*

It is now generally recognized that the body-cavity in the *higher* Metazoa may be referred to either of two very distinct types. The first of these, typically developed in Annelida and Vertebrata, is lined by a definite characteristic epithelium, from some of whose cells arise the genital products, while others become the renal excretory cells. It appears at an early stage in development as a more or less continuous space, and it communicates with the





